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Problems of Economics

Selected Articles from
Soviet Economics Journals in English Translation

IN THIS ISSUE

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On Planned Indices of Economic Effectiveness of Capital Investments in the National Economy of the USSR

Methodological Questions of Determining the Economic Effectiveness of Capital Investments

On Productive Labor Under Socialism

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Journals in English Translation

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. Strumilin:

n the Determination of Value and ts Application Under Socialism

As we know, the definition of value remains an important sk under socialism. Moreover, with the abolition of the pitalist method of production this task and the accounting stem serving it "becomes more important than ever," in arx's words. (1) Socialism opens up the widest prosects for the application of value in national economic planng, primarily in regulating labor time and in the distribuon of social labor between the different categories of prouction in proportion to their requirements. But a deterination of value is needed not only here. The reduction of lue may serve as a measure of the efficiency of our anned capital investments and, therefore, as an indispensable uide to their optimal planned distribution in the interests a maximum saving of time and the highest rate of growth labor productivity. Comparison of the relative value and cal labor requirements used to produce one and the same mount of goods in the different republics and regions of e USSR will facilitate the planning and rational distribuon of the productive forces in the country, while a similar mparison within the framework of the world system of cialist countries may be used in the interests of the most ational international distribution of labor, cooperation and pecialization of production. Finally, the determination of e value of different goods is of the utmost importance for e rational planning of the prices of these goods and for the ccounting of the corresponding accumulations, as well as r the maintenance of an adequate equivalence of exchange domestic trade and the highest possible profitability of xports and imports.

True, up to a certain time we were content in our planning ractice to do without a determination of the value of prodcts. Prices were planned with a partial view towards acounts of the cost of production, and where they were inadeuate our failings were sometimes corrected by market lements. But these failings always played only into the ands of profiteers, to the detriment of the vital interests of e social economy. Such failings are particularly dangerus when they are made in the planning of the prices of ommodities used in the exchange between town and country. or a long time we did not even have any accounting of prouction costs of agricultural produce, and agricultural prices ere planned without any proper bearings. The experience the price "scissors" of 1923, as well as the practice of ixing grain delivery and procurement prices up to 1953, eaches us that serious disproportions and delays in conomic development are caused by blunders in planning this field. The greater our plans for increasing inestments in the different branches of the economy and e greater the mass of commodities realized on the ome and foreign markets, the more accurate must be e computation of the effectiveness of these investments nd the more important it is to determine the value products.

The need to determine the full social value of the goods produced, along with an account of their production costs, i.e., the individual expenses involved in their production by each cost accounting enterprise taken separately, has become more and more pressing in recent years. The reorganization of the MTS and the change in the system of planning of collective farm production have greatly facilitated the determination of the value of food and raw material resources of the countryside, while the reorganization of industrial and construction management and the setting up of economic councils have created new opportunities for solving this problem in these spheres too. At the same time these measures confront the planning of prices with new demands.

A most important feature of the planning of prices of producer and consumer goods in the USSR hitherto has been the deliberate redistribution, through the price mechanism, of nearly all accumulations from subdivision I of social production to subdivision II.

It is known that all new value, constituting the national income d, is created only by living labor, and is therefore proportional to the expenditure of such labor in the different enterprises. It is also known that under conditions of socialism these expenditures are compensated in proportion to the quantity and quality of labor used in the different enterprises. From this we conclude that the national income created in the various industries and enterprises is proportional in value to the wage fund v paid out at these enterprises. This conclusion, applied under socialist conditions to all branches of material production, may be expressed as follows:

$$d_1 : v_1 = d_2 : v_2 = d_3 : v_3 \ldots = n \text{ constant} \quad (1)$$

In other words, the ratio between the national income and the wage fund represents a constant quantity in any branch of production. The national income consists, in addition to wages, of the entire accumulation fund m. Substituting $m + v$ for d in formula (1) we obtain a new series of equations:

$$(m_1 + v_1) : v_1 = (m_2 + v_2) : v_2 = (m_3 + v_3) : v_3 \ldots = n \text{ constant} \quad (2)$$

Subtracting a unit from each of these equal ratios we get a new equation:

$$m_1 : v_1 = m_2 : v_2 = m_3 : v_3 \ldots = (n - 1) \text{ constant} \quad (3)$$

This equation shows that theoretically, proceeding from the economic laws of socialism, the relation between accumulation and wages, m:v, in the total sum of the national income and in any particular line of material production represents a constant quantity for all production, fully determining the rate of accumulation of the socialist economy at any stage of its development.

This theoretical proposition does not, however, preclude the practical possibility of redistribution of the accumulations from one subdivision to another by a deviation of prices from value in the process of price formation. This method is widely practiced in the Soviet Union in price planning. However, the deviation of prices from value as a result of this practice, if we take for comparison not individual commodities but complete branches and major subdivisions of production, is not so great after all. This will be readily seen if we analyze the structure of our existing prices.

In the practice of recent years the elements of past and living labor, c+v, in the structure of the prices of products in the two subdivisions (means of production and articles of consumption) and in the social product as a whole, P, have been distributed approximately in the following proportions:

	Elements of price (in %)			
	c	v	m	P
Subdivision I 150	55.7	26.6	17.7	100
Subdivision II 70	69.0	15.5	15.5	100
Subdivisions I+II	60.0	23.0	17.0	100

As may be seen, the theoretical condition that the ratio m:v be the same in all branches of production is not observed in the price structure given above. However, for it to be observed it is enough to reduce element m in subdivision II from 15.5% to 11.4% and transfer this extra-normal surplus of accumulation to subdivision I, following which the share of accumulation in this subdivision too, by rising only from 17.7% to 19.7%, will enter the general rate of accumulation for the whole of the social product (m:v= 74%). Yet, such corrections in the average prices of products in both subdivisions within the limits of 2% to 4% could not cause any upheaval in the realization of the social product. Of course, much greater corrections would be required to bring prices closer to value in such products as vodka, tobacco and similar narcotics. But the very problem of cutting the prices of these products cannot be regarded as a serious one.

In the existing practice of price formation the accumulation element m is most arbitrarily redistributed from one branch to another. But each underestimation or overestimation of this element of living labor in the prices of means of production inevitably also makes itself felt as a corresponding flaw in the calculations of the elements of past labor c, since all living labor materialized in the means and objects of labor at the initial stages of production becomes past labor at the subsequent stages. This factor in the analysis of existing prices must always be borne in mind when resolving these prices into their basic elements.

The element of accumulation in our price structure is determined in a rather intricate and peculiar way. The total sum of accumulation in the entire national economy, m, is made up of two items, termed "profit," and denoted as m_1, and "turnover tax," denoted as m_2. These terms have been inherited by us from the past but their meaning has fundamentally changed before our very eyes. From the surplus value of the capitalists, derived from the unpaid labor of the wage workers, these elements of accumulation have long been converted into national property in the form of various special-purpose funds.

Profit, the basic purpose of which is to ensure expanded reproduction of the social product, and which amounts to some 7% of the price of the product, has been distributed the process of inter-industrial price formation in a new w however. Under capitalist conditions, it will be remembered, as a result of bitter market competition between pr vate capitalists, prices are leveled out spontaneously according to the so-called prices of production in which pro depending upon the capital invested, tends to the uniform rate of profit, m_1:K, common to all lines of business. In planned economy the law of the average rate of profit does not operate, owing to the absence of competition, and price are fixed on the basis of the costs of production. But takin into consideration only production costs at the individual self-supporting enterprises, rather than the full amount of social production costs, and leveling out the rate of accum lation, m_1:(c+v), in proportion to these elements of past ar living labor, we inevitably deflect our prices in practice n only from the "prices of production" but from the social value of the commodities, too.

What direction do these deviations from value take, depending on this or that price system?

The "prices of production," it will be remembered, rais the prices of goods produced in industries requiring heaviest investments, in which the organic composition of capi tal investment, K:v (the ratio of the fixed and circulating capital to the wage fund), is higher than the average for th country. The prices oriented to the rate of accumulation, m:(c+v), on the other hand, exceed the normal prices in the case of goods requiring relatively large amounts of materials for their manufacture. Thereby a certain part of the accumulation is redistributed from subdivision I to subdivision II.

Even more important is the role played by the turnover tax in redistributing accumulation from subdivision I to subdivision II. This tax, which at present affects up to 58 of all accumulation in the country, undoubtedly represents share of the national income created in both subdivisions social production. However, its realization in our price formation practice is shifted almost entirely to subdivisio II. In 1956 the turnover tax amounted to more than 258 billion rubles. Judging by the ratio between the number o workers employed and the wage funds in the two subdivisions, at least 70% of this sum created in subdivision I is transferred through the turnover tax to subdivision II and is accounted for in prices prevailing not at the point wher the respective goods are produced but at the point of their realization in the retail trading system. In addition, after absorbing the former excise and other indirect taxes on th most important consumer goods, this tax is often distributed in the retail prices of these goods quite arbitrarily and rather unevenly.

Flowing into the state budget through the distributing system in the form of certain percentage additions to the wholesale prices of industry in subdivision II, the turnove tax is used on the expenditure side of the budget chiefly fo the needs of public consumption, social, cultural and othe non-productive appropriations. This general use of the turnover tax permits a substantial distinction to be drawn between it and the profits made by our enterprises.

Many economists regard the turnover tax and profits as the results of surplus labor and as the elements of a "surplus product." Such treatment of these concepts is clearl antiquated. Even Marx foresaw that the boundaries of the necessary product under socialist conditions will be appre ciably widened, inasmuch as with the liquidation of the bourgeoisie only the expended reproduction funds and the reserve funds of society will enter the surplus product. Nevertheless, the turnover tax, which is not part of the urplus product, is created only by living labor in proporion to the amount of such labor actually expended. And if n planning practice a different price-fixing principle is aplied, deviations of prices from value are inevitable, and t is essential for us to know the extent of these deviations. 'hese deviations, arising out of the redistribution of accunulation in the price-fixing practice over both profits and he turnover tax, operate in one direction: they underestinate the share of accumulation in the prices of products in ubdivision I. This underestimation of element m in the rices of the means and objects of labor also deflects, of ourse, their total price, $P_1=c+v+m_1$, from the value, $V_1=c_1+v+m$, in a downward direction by the amount of unlerestimation, $d=m - m_1$, wherever m_1 is less than m. And vhen these means and objects of labor enter, in the next tage, the price of the product in the form of past labor, c, his element of costs is also underestimated by the same uantity, $m - m_1$. Hence, the relation between the price and alue of goods in subdivision I may be expressed by the quation $W_1=P_1+2d$, where $d=m - m_1$.

A different relation applies to the products in subdivision I. Here, too, element c enters the calculation of prices, vhich are underestimated by the entire sum of accumulation edistributed from subdivision I to subdivision II. We shall ame it d_1. However, the entire underestimation under elenent c is thus fully covered by element m being increased y this amount of d_1. Here this quantity is $d_1=m_1 - m$, ince accumulation m_1 in the price of the product exceeds he average rate of accumulation. This means that in order o shift from price to value here all that is necessary is to educe accumulation m_1 by the quantity d_1 and to increase ast labor, c. This will change only the structure of price ut not its magnitude. For subdivision II we get the equaion $P_2=W_2$. In other words, the sum of the prices of conumer goods is equal, in our price formation practice, to he sum of their values.

In the total sum of products of both subdivisions no such quality between prices and values results from our price ormation practice. This might be explained by the fact that nder socialism the products in subdivision I cease to be ommodities. So long as they are confined to the inner turnver of the single socialist "factory and office" they should e regarded as merely semi-finished goods in various stages f completion, the intra-departmental turnover of which may e reckoned at their "production cost," i.e., without any elenent of accumulation. Only in their final form of finished onsumer goods, when these products can and should, in iew of the purpose for which they were made, change by he process of sale and purchase from social property into he personal property of the general body of consumers, do hey become finished commodities. Only to this extent does he law according to which the sum of commodity prices is qual to the sum of their values continue to operate under ocialism.

However, in the light of the requirement that every enterrise and, since the reorganization of industrial managenent, all large territorial economic areas headed by ecoomic councils, must work on the basis of cost-accounting rinciples, a price system cannot long be tolerated, even in egard to materials and semi-finished goods, which allows or their unequivalent exchange within departmental, republican and regional boundaries. It distorts the results of ecoomic activity and greatly complicates all mutual accounts n the international exchange, division of labor and cooperaion between the countries of socialism. It is highly imporant also, in the interests of competition with the countries f the capitalist camp, to compare their "world market" rices not only with ours but with the real value of the most important means of production under socialist conditions at each stage of this competition.

There are generally no reasons for refusing to keep an account not only of the cost of production but of the full value of all the means of production and means of consumption under socialist conditions. This is especially so as this can be done more easily in a planned economy than in any other.

Many methods have already been suggested for calculating value and the deviation of prices from the value of products in the USSR. Most of them, however, are complex and cannot be easily introduced without some reform of existing accounting methods. It would therefore be desirable to choose the most accessible of all the methods proposed, not in the remote future but today or tomorrow, in the present state of accounting in each cost accounting enterprise and in each combination of such enterprises, in any economic council.

The point of departure for achieving this may be: for determining individual value, existing calculations of the cost of production in any cost accounting enterprise; for computing the social value of goods at the branch level within the boundaries of a district, a republic and the country as a whole, the same calculation reduced to an average on the required scale.

The first approximation to the value of any product, of course, is its price. But by subdividing each price into its elements, c+v+m, it is easy to derive further approximations. One of these elements, v, or the wage fund, is incidentally most fully and accurately represented in our accounts and may therefore be used as a basis for all further calculations without any corrections.

Inasmuch as the socialist principle of distribution according to the quantity and quality of labor performed, guaranteeing equal pay for equal work, prevails in our country, we may resort to this standard even where it does not correspond 100% to the requirements of theory. For where practice does not conform to these requirements it is practice and not the socialist principles that need correction. The greatest difficulties in determining the labor compensation fund present themselves in the collective farm sector, where the fluctuations in pay in different zones and farms are still very great. But accepting the principle of equal pay for equal work, we are able to apply the same rates of pay in the collective farm sector as have been accepted throughout the system of state farms. Knowing the national wage fund and the national income, we are able to determine the total sum of accumulation as well as the rate of accumulation, m:v, which is constant for all branches of production and all parts of the country for any given period. In this way it is also possible to determine the share of the national income (v+m) in the price of each commodity or its sum total for any enterprise, branch or district. Comparing accumulation m, calculated on the basis of the normal rate, with what results from its actual redistribution in prices, m_1, we also derive the difference, $d=m - m_1$, required to correct the quantity of past labor in each branch of production or region.

The corrections in elements m and c which can be made on the basis of the outlined method to determine the full value of the social product are shown in the model calculation (hypothetical figures) given in the table on the following page.

The points of departure in this table are an approximate structure of wholesale prices (without the turnover tax) in industry, agriculture and construction, and the structure of trade and transport charges in prices to the consumer, the price of all goods to the consumer being taken as 1000

Structure of Prices and Value in the USSR

Branch of production and subdivision	Prices				Value					Deviation of prices	
	c_1	v_1	m_1	P	c	v	m	W	$m-m_1$	abso-lute	in %
A	1	2	3	4	5	6	7	8	9	10	11
1. Industry	400	110	70	580	411.3	110	81.3	606.6	+11.3	-22.6	-3.8
2. Agriculture	150	80	70	300	160.9	80	59.1	300.0	-10.9	0	0
3. Construction	35	30	15	80	42.2	30	22.2	94.4	+ 7.2	-14.4	-1.5
4. Transport, trade	15	10	15	40	22.6	10	7.4	40.0	- 7.6	0	0
Total	600	230	170	1000	637.0*	230	170	1037	—	-37.0	-3.7
I. Producer goods: (a) for subdivision I	235	140	80	455	258.5	140	103.5	502.0	+23.5	47.0	-9.4
(b) for subdivision II	142.5	40	40	222.5	153.0	40	29.5	222.5	-10.5	0	0
Total	377.5	180	120	677.5	411.5	180	133.0	724.5	+13.0	47.0	-6.5
II. Consumer goods: (a) personal	202.5	47	47	296.5	214.7	47	34.8	296.5	-12.2	0	0
(b) social	20.0	3	3	26.0	20.8	3	2.2	26.0	- 0.8	0	0
Total	222.5	50	50	322.5	235.5	50	37.0	322.5	-13.0	0	0
Overall Total	600	230	170	1000	647	230	170	1047	+23.5	47.0	-4.7

* Past labor, c, is underestimated here by 10 units because of too summary calculations of the branch totals without their division into subdivisions I and II.

rubles. In the calculation of value the wage fund is taken, without any corrections, to be equal to v_1; the average rate of accumulation is taken to be expressed by the ratio m:v= 74%, hence m = 0.74v, and we correct c for underestimation by the amount of the absolute magnitude of the difference $(m - m_1)$, so that $c = c_1 (m - m_1)$.

As may be seen from the table, this method, applied to the national economy of the USSR as a whole, does not reveal any great deviations of average branch prices from value. It must not be forgotten, however, that on a national scale each percentage of deviation amounts to millions of rubles. Not having precise data at our disposal on the structure of production costs and prices in all branches, particularly in agriculture in recent years, we are not inclined to draw any concrete conclusions from the above calculation. It is presented only as a model to show a rather simple method of determining the value of any economic goods and services in socialist production.

It is quite possible that certain amendments and corrections will be proposed to this method. Thus, to determine the value of commodities entering the retail turnover it will apparently be necessary, in analyzing the structure of the retail price, to single out not only the profit but also the turnover tax, which falls very unevenly upon the different kinds of consumer goods. Only after this element of taxation is removed from the price will it be possible to use the above method for correcting m and c. But it is clear that no insuperable obstacles will present themselves in the determination of the value of all goods and the comparis of value with prices.

There are a great many ways and possibilities of using the value concept in a planned economy. One of the most important fields for its application is the planning of inve ments in the economy with a view to their relative effectiveness in the different branches and under different con tions of labor. In the past, designers of new projects de mined the effectiveness of investments by the economies resulting from the reduction of production costs through employment of technically superior production methods, compared with the supplementary investments required introduce the necessary technologies. However, econom theory has found such a measure of effectiveness under cialism inadequate.

In a planned economy only the growth of labor product may be accepted as such a measure or, what is the sam thing, the reduction of the cost of output which the new, plementary investments are expected to yield. Of decis importance under socialist conditions are the national e nomic effects of the employment of progressive technol Any economies effected by a reduction of the full cost al ways exceed the possible economies from a cut in prod tion costs alone. In other words, the national economic fect of capital investment is greater than the sum of loc effects of individual enterprises or economic units. Th broadens the limits of the effectiveness of investments modern technology under socialism as compared with capitalism. This advantage of our economic system cannot be neglected with impunity.

In order to bring out in full measure the effect produced by capital investments on labor productivity, production costs, and profitability of production, and the other indices of investment effectiveness, such a grouping of enterprises has to be taken in a given branch of industry in which each, while using the same amount of living labor, differs from the other with respect to the size of its investments in fixed and circulating capital. In such a grouping the growth of labor productivity and of all other indices connected with it will depend primarily upon these investments and the corresponding technical level of production in each group. Owing to the lack of necessary data for such a grouping, we are unfortunately obliged here too to limit ourselves to a quantitative model (hypothetical figures) as shown in the table below.

***

Indices of Effectiveness of Capital Investment

Indices	Groups					
	I	II	III	IV	V	I-V
1. Number of workers, t	2000	2000	2000	2000	2000	10000
2. Capital funds (million rubles), F	160	180	200	220	240	1000
3. Gross output (thousand tons), P	8400	9100	10000	10900	11600	50000
4. Cost of production (million rubles):						
(a) materials, c	62	66	72	78	82	360
(b) wages, v	16	16	16	16	16	80
Total production costs S = c+v	78	82	88	94	98	440
Production costs of 1 ton (rubles), S:P	9.29	9.0	8.8	8.62	8.45	88
5. Accumulation at average rate (million rubles) m=0.75v	12	12	12	12	12	60
6. Gross output in value (million rubles):						
(a) individual, W_1 -S+m	90	94	100	106	110	500
(b) social, W_0= Px10	84	91	100	109	116	500
7. National income in value (million rubles):						
(a) individual, $d_1 = m+v$	28	28	28	28	28	140
(b) social, $d_0 = W_0 - c$	22	25	28	31	34	140
8. Actual accumulation (million rubles):						
(a) total, $m_1 = W_0 - S$	6	9	12	15	18	60
(b) through redistribution only, (+-) $m_1 - m$	-6	-3	0	+3	+6	0
9. Labor productivity in % of average norm:						
(a) for gross output, past labor included, $P = W_0 : W_1$	93	97	100	103	105	100
(b) for net output, $d:d_1$	79	89	100	111	121	100
10. Profitability of investments (in %), $r = (m_1 : F) \times 100$	3.7	5	6	6.8	7.5	6
11. Period of recoupment of investments (in years), X = 100:r	27	20	16.7	14.7	13.3	16.7
12. Growth of national income (in %) $(\Delta d_0 : d_0) \times 100$	—	12	10.7	9.7	8.8	—

In this table the capital funds grow by 50% from the lower to the higher group, while the physical volume of national income grows even faster, by 54%. At the same time, as a result of the simultaneous reduction of production costs by 9% and the increase of the volume of output by 38%, actual accumulation grows even faster – by 200%. All this signifies a high degree of investment effectiveness. But the average profitability of investments does not exceed 6% for all groups. In the absence of reporting data it is difficult to say whether such a modest rate of profitability may be accepted for all our industries. But it is highly significant that if we accept the growth of accumulation, (Δm_1), alone, expressed in percentage of the additional investments, (ΔF), as a measure of effectiveness of investments, then it will be equal to about 15% according to our table.

Of considerable interest is the determination of the value of $m_1 - m$, representing the difference between actual accumulation and the average rate of accumulation in the entire national economy. It is a result of the redistribution of value caused by the unequal technical level and labor productivity in the different groups of enterprises. This index appears to me to be particularly suitable as a measure of the relative effectiveness of investments. With an equal number of workers employed, and decreasing or increasing the amount of actual accumulation in each of the enterprises as compared to the average rate of accumulation for the whole industry, it also determines the deviation of each from the average level of modern technical equipment of labor for the industry as a whole. The rate of technical progress and, consequently, the average technical level attained by the various branches of production are not at all the same. In our example an increase in the capital funds by 10% or 20 million rubles yields an increase in accumulation ($m_1 - m$) amounting to three million rubles, bringing the investment effectiveness to 15%. With a different level of technology and investments, however, the same percentage of investment will constitute a different sum and result in a totally different rate of effectiveness. There is no need to decree these rates, as is already being done in various "standard methods." It would be sufficient to study what they actually amount to and the laws governing them.

Incidentally, as may be seen from the table, the index $m_1 - m$ is equal to $W_0 - W_1$, i.e., to the difference between the social and individual value of the product in any enterprise and line of production. This is only added proof of the importance of studying these economic categories in a planned economy. By studying the investment effectiveness rates in all branches of labor and weighing them against the labor force, it would not be difficult to derive the average rate of investment effectiveness for the national economy as a whole. This would in turn make it possible to single out the weakest points of socialist production to which new investments could be directed with the greatest effect. At the same time, in planning this or that way of distributing available resources, it would be much easier than at present to establish with greater precision, on the basis of such effectiveness rates, the total result of each of the planned variants of distribution.

The present method of calculation of the periods of recoupment of investments in individual new projects is clearly inadequate for this purpose. First, its indices do not lend themselves to broad generalization and application to whole industries and the economy as a whole. Secondly, they are likely to be misleading even in individual cases. Suppose a designer comparing two alternative versions of a project corresponding to the investment of 200 and 240 million rubles in our table finds that as a result of lower production costs in the second version we save 6 million rubles a year, so that the additional investment of 40 million rubles will be "recouped" only in 40:6 = 6.7 years. This is incorrect, of course. Proceeding from the calculation of full value in our table, we can see that the accumulation in this case will amount to 18 instead of 6 million rubles a year. Hence the investment of 40 million rubles will be "recouped" in 2.2 years, i.e., three times as fast.

The advocates of the introduction of "prices of production" in our price formation practice — Z. V. Atlas, L. A. Vaag, and others — explain the need for calculating profits in direct proportion to capital invested as being in the interests of "better employment of fixed production capital." "The profit made," asserts Comrade Atlas, "should reflec the real successes of each enterprise not only in reducing production costs but in efficiently using production capital and accelerating its turnover." (2) This thesis can be accepted. What interests us are only the real successes i saving living and past labor along the lines of all determining factors, including savings effected by new technolog and the equipment of living labor with it. But who can determine a priori that this effect is directly proportional to the capital invested? Maybe in reality it lags behind this growth or exceeds it. Such proportionality may not be established without any proof, arbitrarily. One may proceed only from the objective need for such proportionality if it exists in reality, relying here on the concrete requirement of this or that economic law and comparing theory with actual practice.

As we know, neither Soviet practice nor the economic laws of socialism confirm sucn an objective need for price of production. Comrade Atlas himself admits that in our system only living labor "creates value" and that "under socialism the law of equal rates of profit does not operate. He regards these as "elementary truths." But at the same time he proposes a method of planning standard profit which fully coincides with both "prices of production" and the demands of this law of classic capitalism which, he hir self admits, no longer operates. The difference between prices of production under capitalism and under socialism is seen by him only in the fact that under capitalism they are determined spontaneously, while under socialism they will be fixed in a planned manner, deliberately, and for thi reason alone will become "a category of socialist prices of production."

However, planning which disregards economic laws, disdains even elementary truths and thereby opens the road t arbitrary voluntarism, can hardly be regarded as socialist And to decree an equal rate of profit as a law of socialism would be arbitrariness of the purest kind. Even Comrade Atlas himself dares not do this, making the reservation th his rate of profit does not include the entire turnover tax and that "for individual branches and enterprises and for in dividual economic regions" it is permissible to fix "differentiated, i.e., individual rates of profit." (3) But Comrade Atlas fails to suggest any principle for such differentiation. And this only opens the road still wider to even more unprincipled and arbitrary action in price-fixing pra tice.

The most original thing about Z. V. Atlas' conception, however, considering that he demands an equal rate of profit within the limits of individual branches of labor only is that such a principle of price formation represents a practical impossibility. Indeed, turning to the figures in Table 3 we see that the level of profit within the limits of an individual industry, if we are guided by the law of value does not remain constant but grows quite perceptibly (fro 3.7% to 7.5%) in accordance with the growth of labor productivity and even exceeds it. This is precisely what mak it an entirely objective indicator of the effectiveness of ca tal assets generally, and of the new, supplementary investments in advanced technology, in particular. Thus the tas of comparing investment effectiveness under different conditions — for which purpose prices of production are reco mended to us — can be quite satisfactorily solved without them, by taking into account all the elements of social valu

Should anyone decide to shift from value to prices of production in the same table he would at once come upon two surprises.

Accepting an equal rate of profit, it would be necessary to increase the sum of profits in the group of enterprises with the smallest investments by three million rubles, and in the group with the largest investments to reduce them by 3.4 million rubles below value. In this case the rate of profit would be leveled out artificially for all the enterprises at 6%. But by becoming equal it would cease to be a measure of the clearly different efficiencies of the investments in enterprises with such different structures of assets.

The second surprise will prove to be even more irksome to the authors of this conception. No matter how different the conditions of production in the various enterprises may be, and therefore also the *individual* value of each unit of production of the same kind, their *social* value will be the *same* provided their quality is the same. In the table shown on page 7 it is assumed to be 10 rubles a ton. But according to the "prices of production," if we level out the rate of profit with production costs being constant, we would have to fix different prices for identical products owing to the deviation of prices of production from social value: in enterprises of group I one and the same commodity would be priced at, say, 10 rubles 35 kopeks a ton, and in group V at 9 rubles 70 kopeks. Under this system of prices the most backward enterprises would, without any effort, get the same rate of profit as the most advanced enterprises. Both of them would lose all incentive to compete for the best use of their resources. The only salvation from all these troubles would be the fact that such a system of unequal prices for equal values is impossible under our conditions.

Lower prices for products of the advanced enterprises in their competitive struggle with the more backward ones is a method practiced under capitalism. Selling goods a dime cheaper than the competitor, reducing him to bankruptcy and winning the market, is the direct means of achieving an equal rate of profit under capitalist conditions. Our socialist enterprises have no need for such competition. But equal prices for equal goods under unequal labor equipment in different enterprises means an unequal rate of profit for them. Considering this soberly in the planning of investments for optimal use of all the resources of past labor, it is necessary to orient our prices to the level of the *social value* of all goods.

The advocates of prices of production believe that the principle of profitability oriented towards an equal rate of profit, as proposed by them, is not "a far-fetched principle." It would be more correct to say, however, that it is a flimsy principle of price formation or at least one whose implications have not been considered by them.

The grouping represented in the table shown on page 7 may be used in another respect too. By bringing out in full measure the *differential profitability* of enterprises with different levels *of technology* it enables us to raise in the first place the question of the feasibility of modernizing and raising the level of the most backward enterprises at the expense of the accumulation built up by the most advanced enterprises from their extra-normal surpluses. These accumulation surpluses may be regarded under our conditions as a special modified form of rent. Like other forms of rent it springs from inequality of production conditions in the various enterprises. Except that here this inequality results not from natural differences or from different positions of the objects of exploitation in space, but from legitimate transformations of these enterprises over time. Even the most advanced technology under conditions of technical progress is inevitably subject to obsolescence. Such is the objective economic law, which cannot be neglected. In capitalist conditions neglect of this law leads to bankruptcy; under socialism it entails only the need for planned and preventive modernization of obsolescent technology.

The necessary resources may be secured in various ways. The most natural way under socialist conditions, however, is to draw them from the undeserved growth of accumulation in those enterprises which, having originated later than the others, have found themselves in a privileged position only because of this fact. Index $m_1 - m$ in our table plainly shows where these surpluses are formed and where they should be primarily directed and realized through the budget, in full or in part, in the form of a modernization fund.

In group IV of this table these super-normal accumulation surpluses, as already pointed out, constitute 15% of "supplementary investments" (3 millions out of 20 millions); in group V (6 millions out of 40 millions) they are also 15%, and in relation to the total fund (240 million), not more than 2.5%. Might it not, perhaps, be simplest to build up a current modernization fund by imposing a special tax upon all the newest factories, amounting to say 80% of the magnitude of $(m_1 - m)$ or as much as 2% of the total amounts allotted to them? The direct connection between the volume of investments and the above-average accumulation in all the newest enterprises cannot be doubted. Nor can there be any doubt as to the wisdom of leveling out the technical level of all socialist enterprises by raising the more backward ones. This will ensure the highest rates of growth of labor productivity and the most favorable conditions of socialist emulation among the workers.

However, in the first place it is necessary to make a thorough study of the actual conditions and laws governing the effect of investments on the technology and profitability of our Soviet enterprises. Further discussion abstracted from facts and concrete calculations will not bring us nearer to our goal.

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A. Yefimov and V. Krasovskii:

On Planned Indices of Economic Effectiveness of Capital Investments in the National Economy of the USSR

Growing capital investments in new construction and the reconstruction of enterprises in the USSR are the basis for the high rates of socialist reproduction on an enlarged scale. It will be recalled that in the current seven-year period (1959-1965) state capital investments will total close to 2 trillion rubles. If we add to these investments the capital outlays from non-centralized funds, the capital investments of the collective farms and also housing construction from funds of the population and with the help of state credits, all capital investments will reach a sum close to 3 trillion rubles. Thus, in this seven-year period approximately as much money will be invested in the development of the national economy as in all the preceding years of Soviet rule.

Among problems of national economic planning special importance is now attached to the fullest and most effective utilization of the funds assigned for new construction and the reconstruction of operating enterprises, for modernization and the introduction of new technology, for the greatest possible acceleration of housing construction. Planning personnel now bear much greater responsibility for the proper determination of the effectiveness of capital investments, for the exploration of new reserves to enhance this effectiveness, for high-quality and all-round appraisals of one or another variant of construction from the standpoint of the national economy.

Much attention was paid to problems of capital construction and the possibilities of the most effective utilization of capital investments in the report of Comrade N. S. Khrushchev at the 21st Congress of the CPSU and in the speeches of Congress delegates.

The June (1959) Plenary Meeting of the Central Committee of the CPSU, which outlined a comprehensive program for accomplishing the tasks of the Seven-Year Plan and accelerating technical progress in industry and construction, raised with utmost sharpness the problem of increasing the economic effectiveness of new technique and sharply criticized the harmful practice of developing costly machines, automatic transfer lines and other sets of machinery and equipment whose application does not yield a tangible economic effect.

The Plenary Meeting of the Central Committee of the CPSU demanded of all industrial executives, scientists, planners and designers that in elaborating and introducing new technological processes, machines, equipment, and building elements, they should first of all proceed from the need for the most rational and economical use of social labor, material resources and money; they should ensure greater output, better quality, lower production costs, higher labor productivity; they should strive to make work easier and working conditions more healthful; they should provide for the observance of safety requirements, for faster and cheaper building work and a reduction in the period needed for the recoupment of capital investments as compared with the best achievements of Soviet and foreign science and technology.

Criteria of Economic Effectiveness

The economic effectiveness of capital investments in the final analysis is expressed in higher productivity of social labor, i.e., in an increase in production with a reduction of its cost. "The saving of time, just as the balanced distribution of working time in different branches of industry, remains the primary economic law on the basis of collective production." (1)

The productivity of social labor grows as a result of the saving of labor on the scale of society as a whole, better utilization of machinery, equipment, raw materials, fuel and supplies, improvement in the distribution and employment of living labor, more rational distribution of production by areas of the country, higher quality of output, etc.

Labor productivity, understood from the social point of view, presupposes as a rule a reduction of capital outlays per unit of output at the higher stages of technical development. The main line of technical progress is the regular reduction in the value of the means of production relative to a unit of capacity and technical productivity. Marx pointed out: "The production of... machinery by machiner lessens its value relative to its extension and operation." (2) As science and technology progress "... more efficien and (considering its scale of operation) cheaper machiner tools, apparatus, etc., replace the old. (3)

In connection with the growth of the first subdivision of social production it is necessary to achieve the most advantageous proportions between the capacity and the value of fixed capital, thereby ensuring a high effectiveness of capital outlays. Although a new machine might be more expensive than the old one, its use increases production, owing to which the value of the machine transferred to a unit of output is reduced. As industry develops and the organic structure of capital grows, especially in connection with integrated mechanization and automation, the saving materialized labor becomes ever more important. Using an ever greater mass of economic labor implements and setting into motion, with their aid, an ever larger mass of raw material, living labor becomes increasingly more productive.

At times the task of raising the productivity of social labor is counterposed to the task of increasing the volume o the national income as the main effect of capital investments. It is known that the volume of the national income depends both on the mass of productive labor and on the level of its productivity. Moreover, an increase in the pr ductivity of social labor also presupposes the fullest use of all the labor resources of society. Ever greater signif cance is also assumed by such factors as a reduction of the working day and a substantial increase of employment in the sphere of services. Thanks to this, the economic role of the productivity of social labor is enhanced.

At the same time, taking into account the time factor a the relatively limited nature of accumulation, we must no llow inflated and one-sided capital investments in the lan which could overstrain the country's material and laor resources and, because of this, entail the freezing of ne outlays made, cause disproportions and consequently ower the productivity of social labor. In calculating the ffectiveness of capital investments, we must take into acount the losses in production and national income in case a ariant providing for a larger capital-output ratio and a onger term is adopted, even if that variant should yield heaper output in the more distant future. Such a method y no means runs counter to the criterion of raising the roductivity of social labor, but arrives at a definition of ffectiveness which goes beyond the bounds of one branch, .e, takes into account the gain in labor productivity of soiety as a whole and not only in the given branch. Thus, in ne case of hydroelectric stations which have higher capital nvestments per kilowatt of installed capacity and require a onger time to build as compared with thermal stations, the alculations of effectiveness must take into account the osses which arise in the entire national economy as a reult of a delay in the commissioning of power capacities, nd the calculations must not be limited to a comparison nly within the power industry, because the hydroelectric tation variant has advantages in the cost of production and n labor productivity figures within the bounds of the indusry itself.

An approach from the standpoint of the national economy s imperative in determining investment effectiveness and abor productivity at all stages of planning. It is wrong in alculating the economic effect to examine in isolation the conomy of one plant or one branch. It is a fact, for exmple, that greater concentration of ores can lead to a lowring of productivity at some concentration plants (even if he higher quality of the ore concentrates obtained is igured in corresponding equivalents). But, on the other and, this ensures greater labor productivity on the scale f society, since the lower productivity of the concentration lants is more than compensated for by the growth of labor roductivity at the metallurgical plants as a result of procssing raw material of improved quality. Many examples an be cited where some branches make additional outlays o obtain products of a higher quality with the object of inreasing labor productivity in other branches of the national conomy.

Scientifically-based calculations of investment effectiveess require a correct estimation of value, the exploration f ways of determining it at least approximately. On the cale of the entire national economy it is already possible o make a number of substantiated calculations of investment effectiveness, utilizing data on the total product, naional income, labor resources and fixed capital. But in ractice, accounting of the expenditure of materialized and livng labor by separate branches of the economy and by items f output is done according to production costs, without inluding in the results the labor for society, which leads to ubstantial errors in estimating effectiveness. In particuar, in assessing measures for integrated mechanization nd automation, when a change is made from a simpler oranic structure of capital to a higher one, calculations of ffectiveness done on the basis of production costs give minimized results.

Some studies on the practical determination of value are nder way now. Irrespective of the results of these studies, t is necessary in determining the economic effectiveness f capital investments to work out a number of approximate alculations of value on the basis of average branch producion cost data and the prospects for changes in production osts during the seven-year plan. In any case, it is absolutely necessary to make test calculations of operating freight rates, selling prices and so on, if they diverge sharply from value. It is known that some selling prices and freight rates reflect a substantial redistribution of the surplus product. For example, the calculation of the comparative value of goods haulage by rail and motor transport is rendered difficult if we use existing operating rates, because prices of fuel and lubricating oils for motor vehicles include the turnover tax, while the prices of coal do not include it; moreover, the cost of motor haulage does not include depreciation, repair and maintenance of highways, while the cost of rail haulage includes depreciation of the rail bed and all line and station installations; lastly, the motor freight rates include a high planned profit, while the profit in rail freight rates is much smaller, etc.

Test calculations are also needed in cases where a large part in production costs is played, for example, by preferential rates for electric power or high rail freight rates for goods which have a high value but do not require large transportation outlays; the use of so-called "average" prices when all areas have the same price, which already includes the average payment for goods transported by rail, makes it impossible to determine the effectiveness of building a factory in a definite locality, etc.

At the same time it is necessary to take into account the fact that the new enterprises will begin operating after a number of years in a different economic situation than at the moment of their designing or building. Therefore it is absolutely essential in some cases to verify the calculations of effectiveness relative to the future trend of production costs, to a certain extent taking into account the changes in technology, economy, and organization of production over the planned period.

Tasks of Planning Agencies in Determining the Effectiveness of Capital Investments

Calculation of the effectiveness of capital outlays must be an integral part of planning at all levels — from the USSR State Planning Committee to the economic councils and enterprises. Yet the methodological regulations for planning agencies now in force do not contain special instructions on determining the effectiveness of capital investments, on methods of substantiating the economically most effective trends of capital outlays.

It is wrong to think that determination of economic effectiveness is limited to an analysis of the effectiveness of some variants of a project, of separate technological methods or designs of machines. It is this wrong conception, supported by some of our theoreticians as well, that is current among some of our planning workers. Such an understanding of the problem greatly narrows down the tasks of national economic planning and leads to a situation in which major questions of capital construction are being decided without adequate calculation of economic effectiveness.

The problem of investment effectiveness has various aspects, and in view of this at each stage of planning social production there arise special problems of determining the economic effect which demand specific methods of solution.

In drawing up a national economic plan for the country as a whole and for the union republics the need to determine the economic effectiveness of capital investments arises in the following aspects:

(1) to reveal the possibilities for the most effective use of accumulations and, consequently, the possibilities for accelerating the rates of economic development in the USSR;

(2) to select the most effective structure of capital

investments which conforms to the basic aim of the plan and predetermines the rates of preferential development of separate branches of the national economy;

(3) to determine the comparative economic effectiveness of capital investments in substitutable branches of production (the comparative effectiveness of different modes of transport, fuel, electric power, structural and building materials);

(4) to allocate investments most effectively in new construction and reconstruction, in the development of the country's new and old areas; to choose the most advantageous proportions in outlays for equipment, installations and buildings;

(5) to set the most progressive periods of building, commissioning and mastering of capacities.

It is natural that all these problems are solved on the basis of a study of the data of actual effectiveness of capital outlays in the preceding period.

In working out plans in the economic councils of the economic administrative areas, the problem of effective use of capital investments should be solved first of all from the point of view of the integrated development of the given economic area.

The problem then arises of determining the most effective structure of capital investments which conforms to the specialization of the given economic area. It is necessary to reveal the main trends of capital investments which ensure the development of regional centers for the building industry, for spare parts and repair facilities, the general power supply, access roads, etc. Investment effectiveness must also be studied from the point of view of the comprehensive use of raw material resources (ore, oil, gas timber and coal), the utilization of by-products and auxiliary products, the joint organization of subsidiary and auxiliary shops. Proceeding from this, the main trends are determined for the effective specialization or combination of enterprises and also the most rational location of enterprises, taking into account the advantages of regional planning.

It goes without saying that the differentiation of the abovementioned problems in determining economic effectiveness does not mean their isolated solution at each stage of national economic planning. It is clear that regional problems must be considered not only in the respective economic council or in the State Planning Commission of a union republic, but also in the central planning agencies.

In working out technical projects and their assignments the problem of economic effectiveness of capital investments embraces the following range of questions: choice of variants for the development of separate lines of production, the building of new enterprises, expansion and reconstruction of operating ones; when the program for the development of the given branch has already been set, the sum of possible capital investments fixed, and it is necessary to choose the most efficient technological schemes, construction and transport solutions — the best organization of production and labor and the limits of the rational specialization of enterprises.

The problems of introducing new machinery, new lines of production, new technological processes, inventions, rationalization proposals, etc. are also solved at this level.

Uniformity in the solution of problems of economic effectiveness at different stages of planning capital investments and the introduction of new technique must be ensured by uniformity in the methods of planning, uniformity in the criteria of economic effectiveness and the system of indices of effectiveness covering all stages. This does not do away with the need for special indices and methods for each stage of planning investment effectiveness.

Specific Features of the Methods of Calculating Economic Effectiveness in Drawing Up National Economic Plan

The range of questions enumerated above which should be considered in determining investment effectiveness at different stages in the working out of national economic plan requires the elaboration of improved methods of calculation and a broader system of indices of effectiveness. The June (1959) Plenary Meeting of the Central Committee of the CPSU gave the following instruction in its resolution: "For the purpose of properly establishing the sequence of integrated mechanization and automation measures in the different branches of the national economy, for concentrating efforts and material resources in the most important directions, the USSR State Planning Committee, the USSR Academy of Sciences, the State Scientific and Technical Committee of the USSR Council of Ministers, the USSR Academy of Construction and Architecture are hereby instructed to elaborate in 1959, with the cooperation of interested organizations, a method of determining the economic effectiveness of introducing mechanization and automation of production, taking into account the specific features of the separate branches." The Plenary Meeting specially pointed to the need, in working out the methodological problems of economic effectiveness, to pay special attention to major national economic problems of comprehensive mechanization and automation, the sequence of carrying out these measures in various branches of the national economy, to the concentration of resources and efforts in the most important directions. All these national economic aspects of the problem of effectiveness acquire all the greater importance in working out general questions of planning capital investments in the national economic plan.

The methods now used for determining investment effectiveness consist primarily of comparing the effectiveness of two or more projects. This narrows down the range of indices of effectiveness and the concrete methods of calculation. These methods are hardly acceptable for national economic planning and should be further elaborated.

Thus, the "Temporary Standard Method Guide," issued i 1956 by the State Committee on Techniques, jointly with th USSR State Planning Committee, the USSR Construction Committee, the Labor and Wages Committee and the USSR Central Statistical Board, was limited to examining the effectiveness of introducing new techniques and did not set any broader tasks. "The Standard Method of Determining the Economic Effectiveness of Capital Investments in New Technique in the National Economy of the USSR," drawn u on the basis of recommendations of the All-Union Conference on Problems of Economic Effectiveness, is broader i content and seeks to give recommendations on national economic problems. But this method guide, too, pays chief attention not to planning problems but to a comparison of variants of separate projects.

One of the chief means of raising the level of planned calculations of economic effectiveness of capital investments is the working out of a system of planned standards capital outlays per unit of output; the time needed for the construction and mastery of capacities; increase in labor productivity depending on the growth of capital per worker reduction of production costs, recoupment of capital investments, etc.

The standards for timber-felling, wood-working and timber-rafting enterprises worked out by the State Institut for Planning Timber Enterprises are an example of plann standards of capital outlays per unit of output. The standards are differentiated by areas, type of enterprise (new plants, second sections, maintenance of capacities, etc.), types of expenses (singling out industrial and housing construction, rail construction, building and assembly work, etc.); there are also "aggregate" standards for the industry as a whole.

Here are some approximate standards of capital expenditures per unit of output drawn up by the Institute for construction of second and subsequent sections of timber-felling enterprises (in rubles per cubic meter of timber):

Economic Administrative Area	Capital investments per cubic meter		
	Total	of which:	
		Building and assembly work	Equipment
Arkhangelsk	60	51	9
Altai	50	43	7
Bashkir	50	43	7
Kamchatka	84	72	12
Komi Autonomous Republic	62	52	10
Murmansk	65	54	11
Khabarovsk	63	53	10

Detailed tables of standards for building new timber-felling enterprises have been drawn up for each economic area. For the Krasnoyarsk economic area the figures for capital expenditures per unit of output are as follows (in rubles per cubic meter of timber):

Type of Job and Expenditure	Timber-felling enterprises having:	
	narrow-gauge railway	motor roads
Capital outlays per cubic meter of timber	126	118
including:		
building and assembly work	98	91
equipment	22	21
among the total costs of the job:		
transportation	36	31
power supply	4	4
repair and machine shops	4	4

In our opinion, the standards of capital investments per unit of output worked out by the State Institute for Planning Timber Enterprises, and also the standards for the building periods of industrial enterprises drawn up by the USSR State Construction Committee, notwithstanding all their possible concrete shortcomings are precisely the type of planned methodological and calculating materials for determining the effectiveness of capital investments which our planning system needs.

Planned indices of effectiveness must be subordinated to the main indices of socialist expanded reproduction over the planned period (rates, proportions among branches, etc.) and the coefficient of effectiveness for the entire national economy. But by no means should they be merely a repetition in different branches of the average national economic indices. On the contrary, the planned indices must be differentiated by branches and groups of branches of a similar pattern.

In our opinion, the major indices which should figure in working out plans include the following important relationships, reflecting the efficiency of production:

(1) relationship between the growth of capital per worker and the rise in labor productivity;

(2) relationship between the dynamics of the value of fixed capital and the physical volume of output and the national income.

The faster growth of labor productivity as compared with the increase in capital per worker is most often associated with the introduction of highly efficient and relatively cheaper machinery and also its improved utilization. It is important to note that labor productivity in our industry is rising at a faster rate than capital per worker in terms of value. Thus, in 1956 capital per worker (in terms of value) was 60% above 1940, the consumption of electricity as motive power increased 97% and output per worker 112%.

At present, when technical progress is increasingly expressed not in the replacement of hand labor by machinery but in the further development of machinery, the main tendency is to increase the "yield" of fixed capital in the form of output and national income. In 1956 the fixed capital of Soviet industry increased by 193% as compared with 1940, while total industrial output rose 254%. During the same period the fixed capital of the national economy of the Soviet Union increased by 145%, while the national income grew 213%.

At all stages of planning it is necessary to indicate the most advantageous trends in effectiveness, under which there should be simultaneously reached an improvement of all indices, i.e., a cut in capital outlays per unit of output, a reduction in the period of construction and a lowering of production costs. The resolutions of the 21st Congress of the CPSU stress that the "Communist Party attaches prime importance to the most effective trends in capital investments, which make it possible with smaller outlays of resources to expand production capacities and increase the output of industrial goods in the shortest periods, with a sharp rise in labor productivity and a cut in production costs."

At present the task of effective reconstruction and modernization of operating enterprises assumes particular urgency. The resolution of the 21st Congress of the CPSU points out: "To make the most rational use of capital investments, it is necessary to channel large funds into reconstruction, expansion and technical re-equipment of operating enterprises, renewal and modernization of equipment, which will make it possible to expand output and raise labor productivity more rapidly and with smaller outlays than through the building of new plants." The use of aluminium and plastics in cable production, instead of lead and copper, the utilization of casing head gas in the production of synthetic rubber, instead of alcohol, offer examples of the most effective channelling of capital expenditures.

Exceedingly great importance is assumed by the proper determination in the plan of coefficients giving the ratio of capital to output. In compiling the planned balance sheet of the national economy, summary coefficients giving the ratio of capital to output are needed for calculating the most general proportions in the balance sheet. It goes without saying that these coefficients should reflect the possible progressive shifts in technology and the structure of material production. According to calculations made for 1957 the summary index of the capital-output ratio for all industries was 0.56, with the index for industries of Department A being around 0.90 as against 0.18 for industries of Department B.

Together with summary coefficients of the capital-output ratio the system of planned indices should also contain a number of branch indices, such as the value of a unit of capacity in different branches and production lines, calculated as a standard magnitude; the increase of output per unit of commissioned capacities; the index of yield of output per unit of fixed capital; the index of growth in output per unit of increase in capital investments.

As a rule, it is necessary to use natural measures of output for comparing the value of fixed capital (or capital expenditures) and output. When it is difficult to apply direct natural measures or converted measures (for example, units of conventional fuel, etc.) it is possible to use value indices of output, but calculated in stable prices. In case of sharp changes in the pattern of plants and a growth of output through specialization, it is necessary to introduce corrections for "specialization" similar to the coefficients of combination and specialization employed in reports for 1928-1930.

The value of fixed capital or capital outlays should be expressed not only in identical estimate prices but, in addition to that, the variant of new construction should also take into account the planned reduction of building costs, specifically the planned cut in the cost of equipment. In comparing the growth of output and of capital investments it is essential to show that this increase is connected precisely with the investments in the given period.

The calculation of capital outlays per unit of output is made with account being taken of other related expenses; at the same time expenses for auxiliary products and by-products and branches should be excluded.

The index of the period of construction is also an important indication of investment effectiveness. Together with the index of the yield of output per unit of new capacity it, as it were, determines the general "lag," i.e., the general period of "delay" from the beginning of construction up to the moment when the new capacities start to "yield" output.

The manual of the USSR State Construction Committee, giving standards for the duration of construction, can be taken as a temporary guide of standard construction periods, although the experience of our best building sites and latest foreign data indicate great possibilities for further cutting construction periods.

The gain from the commissioning of an enterprise ahead of schedule can be figured according to the value of planned output in the period between the scheduled and actual commissioning, minus the material outlays (the cost of materials, fuel, power, depreciation allowances and repairs). On the other hand, the losses sustained by the national economy from a delay in commissioning and the increase in uncompleted building work is determined by the size of the national income or net product not received (because of the delay in the commissioning of the enterprise) both at the given plant and also at allied enterprises where, owing to the non-delivery of semi-finished products, the manufacture of the following final products was delayed.

Particularly great losses are caused by delays in the commissioning of capacities in branches which produce raw material feeding a successive chain of manufacturing enterprises.

One of the major indices of economic effectiveness of capital investments is the index of the time required for th recoupment of the investments. Recoupment expressed in years indicates the period in which capital investments ar recouped through a saving on current expenses. For variants of developing production in which, together with an in crease in labor productivity and a cut of production costs, there may be a growth in capital outlays per unit of output the recoupment index creates a basis for selecting the bes variants. So far, designing and economic calculations hav limited the estimate of recoupment in the different variant only to the additional capital outlays. Yet in many cases t magnitude of the additional investments in one of the variants is insignificant as compared with the total volume of investments in all of the variants. The calculated magnitudes of recoupment of the additional investments are not characteristic of the total period required for the recoupment of all the capital investments. There may be cases i which the additional investments are recouped in a short time, while the period for the recoupment of all outlays will be long even in the best variant. Thus, whereas the r coupment of partial investments in mechanization and auto mation in the iron and steel industry may take about a yea or a year and a half, the recoupment of all investments, according to data of the State Institute for Planning Metallurgical Enterprises, takes from ten to eleven years!

That is why for planning purposes it is the recoupment of all investments that acquires great importance, and not recoupment of partial outlays, of different variants giving variable basis for calculation. The period of recoupment of all investments is determined by calculating the expecte saving as against the average cost of production in the given branch or as against the sales prices (if the latter conforms to the average cost of production in the branch).

Average branch recoupment indices or coefficients of ef fectiveness can become the basis for fixing planned period of recoupment provided they are improved in accordance with the performance data of the best enterprises and are of a progressive nature. As planned periods for recoupment are worked out by branches, it will become possible to compare the concrete periods of recoupment in a given variant with the planned indices. In calculating recoupment it is not advisable to exclude from the production ou lays the depreciation expenses.

Lengthy recoupment periods of from six to twelve years make it necessary to take into account the changes in the cost of production and prices in the planned period and the possible moral obsolescence of part of the equipment, etc As a rule, in such cases it is necessary to make a compa son with the data on the expected long-term cost of produ tion and not with the current sales prices or current cost of production.

Among the basic planned indices of investment effective ness are also the higher output per worker (reduction in labor expenditure) and a cut in production costs. These i dices are fixed on the basis of a generally recognized me od but with an obligatory analysis of actual operating data and the data of the best enterprises.

Under all these conditions it is necessary to eliminate the diversity of calculating methods which exist at presen in the work of designing organizations, economic councils and industrial enterprises. Thus, in some projects of hydroelectric stations the calculated cost of production o electric power includes the repayment of compensation fo the damage caused by flooding the reservoir area, while other projects do not include these expenses.

In calculating investment effectiveness it is necessary properly subdivide the capital outlays which go for reproduction on an enlarged scale, i.e., for the expansion of capacities; for modernization and intensification of operating equipment; preparatory work for the expansion of production in the future and the replacement of capacities going out of commission. In branches of the extractive industry the replacement of capacities going out of commission absorbs up to 50% of all capital investments in some cases. Outlays for expansion and reconstruction of operating enterprises and for new construction should be shown separately in total capital investments.

Capital outlays for the building of houses and public utilities and cultural establishments, as a rule, are excluded from total capital expenses of the respective projects, and are shown as a separate item. In calculations of indices of effectiveness (capital outlays per unit of output, recoupment periods, etc.), the expenses for the building of houses, public utilities and cultural establishments are not included. At the same time the existence of housing facilities built up, for example, during the construction of a hydroelectric station can be taken into account in calculations of investment effectiveness in the subsequent building of other enterprises there. In comparing the effectiveness of capital investments in old and new areas it is possible to utilize data on existing housing construction.

In calculating investment effectiveness, account is taken not only of the direct expenses in building the given project, but also of the outlays in related branches. In the mining industry calculations should include not only direct investments but also take into account the expenses for geological prospecting, the survey work and designing of the given project, even though these expenses might have been covered by the budget. As a rule, account should be taken of expenses in related branches which produce raw material, fuel, electric power and supplies for the given branch, i.e., regularly renewed expenditures of working capital. No account should be taken of related expenses in branches which produce elements of fixed capital (related expenses of engineering and electrical equipment plants, cement mills) as long as methods for such calculations have not been elaborated. It is advisable to limit the accounting of related expenses to one or two links.

If it is necessary to calculate the effectiveness of capital outlays of an integrated construction project, these expenses are determined in proportion to the value of building separately the respective enterprises producing the same goods at specialized plants. In this way, for example, it is possible to distribute the capital expenses in extracting alumina from nepheline when cement, soda and potash are obtained simultaneously. In this case the general capital investments of the aluminum works (in the part related to alumina) should be distributed in proportion to the outlays in the specialized production of cement, soda, potash and of alumina itself. It is not advisable to employ the method of simply deducting these outlays, when the investments in by-products, figured according to the standards of capital outlays in specialized branches, are excluded from the total sum of investments. After such deductions it may turn out in a number of cases that the capital investments for the main branch amount to zero (or are even of a negative value).

Capital outlays and the value of operating fixed capital are assessed in identical estimate prices. In approximate estimates it is possible to employ the conversion coefficients of the Central Statistical Board for calculating the value of capital funds in uniform 1955 estimate prices. It is necessary in all calculations of the value of capital funds and their capacities to employ one and the same shift coefficients, reserves, an equal number of days of work a year and the same percentage of idle time. For new enterprises the data on the size of capital outlays should conform to the estimates of the respective projects. Designing data should be verified by the actual expenses of built enterprises.

In comparing variants involving the temporary closing or liquidation of part of fixed capital, in calculations of effectiveness it is necessary to add to the capital investments in the new part of the enterprise the outstanding value of the old capital which has not been covered by depreciation.

Commensurability of Indices of Economic Effectiveness and Choice of a Solution

We propose a system of indices and not one simple index in order to obtain detailed information about the economy and rationality of capital investments. But separate indices might suggest different trends of capital investments. This makes it necessary to have commensurability of the indices so as to ensure a correct solution facilitating the growth of labor productivity and reduction of production costs. Commensurability is achieved by taking account of the time factor so as to reduce to one basis the investments at different times and the effect yielded at different times. Besides the generally accepted commensurability of bigger capital outlays with a saving on current expenses, an opposite commensurability is possible — commensurability of somewhat higher current expenses with a saving on capital investments, but with a simultaneous saving in time and the obtaining of additional output during this period. The method of obtaining commensurability is employed in all cases where alternative solutions arise — different variants of distribution of enterprises, variants of specializing or combining enterprises, savings of fuel and more intricate designs of equipment or greater expenditure of fuel, but more compact equipment, and so on. A few calculation formulas for obtaining commensurability of economic indices have been worked out in the practice of making technical and economic calculations.

Such calculating methods play a big part in designing practices, inasmuch as improved and more exact methods of determining investment effectiveness are still undergoing experimental tests. But in applying recoupment formulas or formulas of converted expenditures as well as of coefficients of effectiveness, we must not forget about their limited possibilities. It is known, for example, that the generally accepted method of "recoupment periods," as a rule, does not take into account the probability of obsolescence of parts of the installation, which in the course of technical progress may prove to be unnecessary although scarce materials and equipment have been used to build them. Nor does this method take into account the long-term price formation trend, because all calculations are made as of the initial year, which clearly exaggerates the effect in future years.

There is a tendency now to apply mathematical methods in determining economic effectiveness of capital investments. Unfortunately, the mathematical apparatus used for these purposes is still inadequate and does not grasp the great intricacy of the economic processes studied. A calculating apparatus of a much higher order must be employed for modern economic analysis, an apparatus capable of reflecting the dynamics of the processes studied and the simultaneous action of dozens of related, interdependent factors. Worthy of attention in this respect are tables of inter-branch relations which determine the chain connection of different lines of production and matrix computations. The complexity of economic problems dictates the use of differential equations which make it possible to determine in point of time the changes in outlays and their results in the socialist economy.

The use of electronic computing machines in national economic planning presupposes the employment for economic calculations of mathematical methods, methods of linear and dynamic programming, the solution of involved extreme problems with the object of determining, on a national economic scale, the maximum effect from carrying out one or another variant of the plan.

The very first results of applying modern mathematical means for determining the economic effectiveness of capital investments suggest that interesting possibilities are opened up by the wider use of mathematical methods.

In solving problems of economic effectiveness of capital investments a large part is played by the time factor. While in solving balance problems we have to deal primarily with a system of linear equations, to find optimal solutions of capital investments it is necessary to turn to systems of differential and finite differential equations. Mathematical methods make it easier to calculate the effective variants of the plan at different rates of development, norms of accumulation, different programs of ultimate consumption, and make it possible to determine more precisely the sequence for expanding production in different branches of the national economy.

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The distribution of capital investments by branches of the national economy, republics and economic areas determines the directions, proportions and rates of development of th national economy. The success and period of accomplishing the main economic task of the Soviet Union largely depend on the effective utilization of capital investments.

The directives of the June Plenary Meeting of the Centr Committee of the CPSU on measures for promoting technical progress demand a higher level of planning capital investments, which in turn requires further improvement of methods of determining the most effective variants of capital investments in building new enterprises, and the reconstruction and modernization of operating plants. Many concrete calculation methods have been devised in the planning work of designing and research institutes. It is necessary to generalize all these materials and to work out a scientific method of determining the effectiveness of capital investments, taking into account the specific features o the different branches of the national economy.

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Methodological Questions of Determining the Economic Effectiveness of Capital Investments

Among the most important economic problems of communist construction are those of the economic effectiveness of capital investments in the national economy. Capital investments must be used most effectively because the rates of growth of production and the period required for the solution of the USSR's chief economic task depend on this.

In his report to the 21st CPSU Congress on the target figures for the USSR's economic development in 1959-1965 Nikita Khrushchev, as well as other speakers who took part in the discussion on the issue, repeatedly stressed the importance of economic effectiveness in estimating the ways and means of solving economic problems.

The resolution of the 21st Congress of the CPSU states that "The Communist Party attaches paramount importance to the most effective direction of capital investments, which should permit an expansion of production capacities at lower expenditures and a growth of industrial output within the shortest possible time, with a simultaneous sharp rise of labor productivity and decline of production costs."

Considerable attention was devoted to problems of the effectiveness of integrated mechanization and automation in the separate branches of the national economy at the Plenary Session of the CC CPSU held in June 1959. The issue was dealt with in the reports and the speeches made at the session. In its decisions the Plenary Session commissioned the USSR State Planning Committee, the USSR Academy of Sciences, the State Scientific and Engineering Committee, and the Academy of Construction and Architecture to develop, in the course of 1959, methods of estimating the economic effectiveness of mechanization and automation, with due regard for the specific features of individual industries. All this goes to show the urgency of working out in greater detail the problem of capital investment effectiveness.

The determination of capital investment effectiveness is closely linked with national economic planning and should become an integral part of it. The economic development plan determines the necessary scale, rates of growth, and the most important proportions of social production, with due consideration for the preferential growth of production of the means of production and, first and foremost, for the key branches of industry (power engineering, metallurgy, chemistry, mechanical engineering), and also for the rise in agricultural output. In elaborating these proportions the application of the balance-sheet method of planning is of considerable significance. The capital investments are distributed among the production branches in line with these proportions. At the same time, in planning capital investments it is essential to take their economic effectiveness into account. The economic effectiveness of capital investments should be determined in the course of working out long-term and yearly plans so as to ensure the most profitable and expedient apportioning of capital investments when the best ways and means for realizing the tasks set by the plan are being sought. The effectiveness indices are also essential for selecting the best versions of designs of new enterprises, for introducing new equipment, in the effective management of enterprises. All this serves to show the immense practical significance of the capital investment effectiveness problem. This problem is of great theoretical interest and it may be solved only on the basis of a scientific generalization of the vast practical experience in planning capital investments accumulated in our country and the elaboration of a number of theoretical problems of the political economy of socialism, particularly those of the theory of socialist reproduction, the theory of value and price formation under socialism.

The theory of reproduction must help to establish the interdependence between the rates of expanded reproduction, the magnitude of accumulation, and capital investments. The study of this interdependence and its quantitative reflection in the plans is an essential condition for successful research into the effectiveness of capital investments. Of considerable importance are the problems of the growth rates for both departments of social production and the effect of their various relations upon the growth of production as a whole, problems of proportionality in the development of the different branches of the national economy, etc.

No less important are the problems of value and prices. In order to obtain a comprehensive solution of the capital investment effectiveness problem and to elaborate the most correct and accurate methods of determining this effectiveness, it is essential to know the value of the concrete items produced and to employ it for the calculations involved. A knowledge of the value involved provides the possibility of applying the capital investment effectiveness indices in planning and, in particular, of employing these indices when apportioning capital investments to the individual production branches.

At present such calculations are rather difficult, due to considerable differences in the relationships between prices and value in different industries and for different articles. Therefore, until the value of concrete items of produce is determined, prices and production costs may be used as approximations to it. It is necessary here to find out the degree of the deviation of price from value due to turnover tax, etc., and to study the problem of the possible use of conventional prices for some economic effectiveness calculations.

Research on capital investment effectiveness under socialism covers a wide range of problems. These include the study of the factors that determine the possible volume of capital investments with due consideration for the accumulations in the preceding period (the effectiveness factor depends on the volume of capital investments); the role

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[*] This article utilizes a prospectus on problems of the economic effectiveness of capital investments and the introduction of new technology in the national economy whose text was written by the author.

played by capital investment effectiveness calculations in national economic planning and the distribution of capital investments among the production branches, economic areas, and enterprises; the study of the absolute effect of capital investments in terms of the increase of the physical volume of the national income; the possibility of determining the absolute effect of capital investments both as a whole and by production branches and individual enterprises; the study of the relative economic effectiveness of capital investments in the selection of the most expedient variants of capital investments; the study of the economic effectiveness of capital investments in new machinery.

A study of all these questions makes it possible to determine what economic factors influence the effectiveness level and how to establish the economic effectiveness of capital investments in planning the development of the national economy, its individual branches, economic areas, and enterprises, so as to obtain an optimal combination of all these factors. The mathematical determination of such an optimum represents a solution of an extreme problem involving the finding of the greatest possible production effect for society with the least possible input of social labor. The political aims and defense requirements of the socialist state must be fully taken into account here, as well. Calculating capital investment effectiveness calls for the application of scientifically-elaborated effectiveness norms (normative coefficients of efficiency and recoupment periods, norms of "capital consumption," norms of building construction periods, etc.).

The solution of the problem of capital investment effectiveness, just like any other economic problem, requires profound scientific analysis and the generalization of extensive factual material. The USSR Academy of Sciences, in close collaboration with the Economic Research Institute of the USSR State Planning Committee and research and designing institutes of individual industrial branches, has started studies of the actual effectiveness of capital investments in the whole national economy and in its individual branches, which had been made in the past years and are to be made in the future in conformity with the plan. The first thing that was essential for this analysis was to elaborate a provisional method of determining the economic effectiveness of capital investments so as to provide a uniform and correct analysis of actual effectiveness by employing this method. Then, drawing on the study of the actual economic effectiveness of the capital investments in the different branches of the national economy, which had been made in the past and are provided for in the plan, the problems of effectiveness reserves and cost accounting methods of stimulating effective utilization of capital investments could be elaborated and recommendations for increasing the yield of capital investments worked out.

The research will make it possible to refine methods of determining the effectiveness of capital investments and to apply these methods to the individual branches of the national economy.

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The problem of capital investment effectiveness in the socialist economy came under discussion in the pages of the Soviet press before the first five-year plan when, with the transition to the policy of industrialization, extensive capital investments were being made in the national economy and there arose the problem of their being directed to the most efficient uses. Different viewpoints were expressed as to the methods of determining the effectiveness, beginning with the complete denial of the right to use value indices in calculating effectiveness and ending with attempts to pattern these calculations on value indices only. Various opinions were expressed on the expediency of employing indices in kind expressed in the form of aunified index sheet with the aid of special coefficients for each index, on methods of comparing the terms of capital investments, especially of long-term investments, on concrete methods of comparing different projects and different variants of capital investment by indices in value terms and in kind.

The practical experience gained in the course of a number of years of planning capital investments and designing the construction and reconstruction of enterprises has created the necessary foundation for solving these theoretical problems and for elaborating practical methods of determining the effectiveness of capital investments in socialist economy. For this purpose it is necessary to make a critical analysis and generalization of the various methods created by practice.

In many planning and design organizations the effectiveness of capital investments is determined by comparing th capital investments required with the current costs of production. This is done by determining the period of recoupment of capital investments. Other organizations determine the sum total of building and operating costs for a rated period. Some organizations proceed from the lowest prime cost of the commodities produced (production costs)

The "Interim Standard Method of Determining the Effectiveness of Introducing New Equipment" published in 1956 and other method elaborations made in the different industrial branches on the basis of the former contributed to regulating the calculation of the effectiveness of introducing new equipment. The "Interim Standard Method" approved the method of recouping capital investments by utilizing a number of technical and economic effectiveness indices. However, they did not show how to establish normative periods within which the investments were to be recouped nor how a given variant was to be chosen under co ditions in which the different indices changed in opposite directions. Some other methodological problems arising when the variants are being compared were not solved either.

The summing up and utilization of the experience gained by branch research and designing institutes, as well as by industrial enterprises, made possible further progress in elaborating methods of determining capital investment effectiveness.

In June 1958, following extensive preliminary work, a National Conference on the Economic Effectiveness of Cap tal Investments and New Equipment was held under the auspices of the Economics Institute of the USSR Academy Sciences and the All-Union Council of Scientific and Engineering Societies. The conference was attended by repr sentatives of a number of research institutes, planning an statistical bodies, designing institutes and offices, enterprises, economic councils, and scientific and engineering public bodies. The recommendations adopted by the Conference were subsequently taken as a basis for draft standard methods of determining capital investment effectivene

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Capital investments in the national economy are made f the comprehensive development of socialist production on the basis of a steady rise in the productivity of social labo

The calculation of the effectiveness of capital investme and of new machinery must be based on indices in value a in kind which make it possible to measure by the same standards the input of human labor of various skills and i different industries as well as the expenditure of labor en bodied in products.

The methodology of determining capital investment effe tiveness must, for practical uses, be coordinated with the system of prices, cost accounting, and production accounting. Of great significance in this respect is the improvement of price formation methods.

Capital investments represent expenditures for the expanded reproduction of fixed capital; they are apportioned to the construction of new and the reconstruction of functioning enterprises and structures, the introduction of new machines, mechanisms, equipment and technological processes, the modernization of machines and equipment, as well as to geological exploration, prospecting, and preparatory work. In determining the magnitude of capital investments, consideration should be given to the fact that, besides capital investments in fixed capital of production, investments may be needed in working capital for the purpose of increasing stocks of raw materials, fuel, semi-finished goods, and other objects of labor.

Since the chief purpose of capital investments is the all-round development of production, their effectiveness, as expressed in value indices, is ultimately measured by the ncrease of the physical volume of the national income attained due to these investments. This magnitude, related to he sum of the capital investments, gives the coefficient of national economic effectiveness of capital investments. This coefficient is of great importance for planning capital investments in the national economic plan, as it substantiates he planned proportions, production growth rates, and the ines of technical progress. The use of this coefficient makes it possible to establish the connection between the magnitude and direction of capital investments, and the volume of the national income, and consequently the volume of accumulation in periods to come. It will also permit the determination of other equally important indices for planning capital investments.

In order to establish precisely the effectiveness coefficient, it is essential to study ways and means of separating rom the sum total of the increase in the physical volume of he national income that part of it which is due to new capial investments. It must be established what portion of capial investments of the current year or preceding years this part of the increase in national income is to be attributed o. The determination of economic effectiveness by branches and individual enterprises must also be examined. So ong as value is not calculated, we have to use prices in deermining the national economic effectiveness of capital investments. It is to be borne in mind, however, that prices deviate from value to a different extent in the various industrial branches. Therefore, their use in calculations of profitability may, in many cases, yield a wrong idea of the actual effectiveness of capital investments in the given branch or project. This is a problem requiring further study.

In selecting the most effective variant of capital investment and introduction of new equipment from a number of available variants, the determination of their comparative ffectiveness is of major importance.

Production costs, additional capital investments (their ifference by variants), and the period of their recoupment re the basic indices of the comparative effectiveness of apital investments.

We have to use production cost indices until the value of he different kinds of commodities has been calculated beause they represent a certain approximation to the correct alculation of effectiveness. Production cost indices are sed to determine differences in production costs for the ifferent variants and to compare these with differences in apital investments. This comparison of differences in prouction costs and capital investments is expressed in the eriod of recoupment or in an inverse value — the coefficient of relative effectiveness. The period of recoupment is determined by the formula:

$$\frac{K_1 - K_2}{C_2 - C_1} = t,$$

where K_1 and K_2 are the capital investments by variants; C_1 and C_2 are the production costs of annual output.

The coefficient of effectiveness is calculated by the inverse ratio:

$$\frac{C_2 - C_1}{K_1 - K_2} = \frac{1}{t}$$

The next formula is more convenient for comparing three or more variants:

$$K_i + t_o C_i = \min, \text{ or } \frac{1}{t_o} K_i + C_i = \min,$$

where K_i and C_i are the capital investments and production costs by variants, and t_o is the normative period of recoupment.

In those cases in which one of the planning variants of a new enterprise or new equipment shows lower production costs as well as smaller capital investment, the question of the period of recoupment of additional capital investments does not arise.

Specific capital investments — the volume of capital investments per unit of the commodity produced — are also an index of capital investment effectiveness. However, it should be borne in mind that specific capital investments do not reflect changes in production costs.

Value indices are not always able to provide an exhaustive idea of the actual effectiveness of capital investments. For instance, a variant that is quite adequate in terms of value indices may call for too much labor or large amounts of scarce materials, etc. In such cases the use of value indices alone may lead to a wrong solution. That is why such indices in kind as labor productivity (output per worker), expenditure of fuel, electric power, raw and other materials, utilization of equipment and production floor space, etc., should be employed in addition to value indices when choosing the most profitable variant of capital investment. The final decision is to be made on the basis of an economic analysis of indices in value terms and in kind.

Some industrial branches may require special systems of technical and economic indices, depending on the special features of each branch. Such systems should be established by methods elaborated within the branch on the basis of general standard methods.

Comparative effectiveness indices may be used in apportioning capital investments among the branches of industry. This is possible, for instance, in distributing capital investments among related industries producing mutually replaceable commodities, such as various kinds of fuel and power, metals and plastics, cotton and synthetic fiber, etc. In these cases the effectiveness indices are employed mainly for solving the problem of which of the related industries should be called upon to carry out the economic task set by the plan. Thus, effectiveness indices may be a help in economically substantiating the choice of which branches of the fuel industry or which fields of the building materials industry should be developed in order to ensure the required output of fuel or to provide materials for the planned volume of building construction at minimum expenditures.

Effectiveness indices may be of great significance in solving problems of the territorial distribution of production, the all-round development of economic zones and areas, the specialization and cooperation of industry, in determining the size of enterprises, the time periods for their commissioning, choice of equipment and technologies, etc.

Capital investment effectiveness for the preceding years may be calculated by comparing data on the growth of net output or of the national income with the amount of the capital investments responsible for this growth.

In calculating the planned effectiveness it is necessary to compare the planned increase in net production with the planned capital investments in previous years that had been put into operation and had brought about this increase.

An essential factor in calculating effectiveness for the most adequate capital investment variants is the comparison of the actual periods of their recoupment (or the inverse magnitude -- the efficiency factor) with the normative values of these indices. These normative indices should be fixed for the national economy as a whole and for the industrial branches on a level that will provide the opportunity for including in the plan the most effective projects conforming to the latest achievements of science. The magnitude of the normative periods of recoupment (coefficients of effectiveness) should be fixed depending on the "capital consumption" of the different branches, the level of the organic structure of capital and rates of technical progress.

A coefficient within 0.1-0.15, which corresponds to a seven-to-ten-year period of recoupment, may be accepted at present as the approximated normative coefficient of effectiveness in industry as a whole. The ten-year periods of recoupment are characteristic of more "capital-consuming" branches, such as power stations, iron and steel works, the chemical and oil industries, and transport facilities. The seven-year periods are typical of less "capital-consuming" branches, for instance, most fields of machine building. Still shorter periods of recoupment may be established for some branches with a low organic structure of capital. The same goes for branches that are characterized by a more rapid rate of technical progress. The coefficients of effectiveness and periods of recoupment have been computed by means of quite approximated estimates. It is only after an analysis of factual materials for the national economy, branches of industry, and individual enterprises that they will be fixed finally and adequately substantiated.

In order to fully estimate the effectiveness of a given variant one must take into account not only the expenses for the construction of the planned object, but also expenses for the development of other, allied production branches, which are essential for the given object. For instance, if a thermal power station is being built, one must take account not only of the capital investments in the station proper, but also those in fuel production to be developed in order to provide the power station with fuel.

In analyzing the different variants of production and especially variants of location, a comparison should be made of the production expenses and expenses on transportation of commodities to the areas of consumption.

Another factor to be taken into consideration in comparing the variants of projects that differ in the time required for their erection is the economic result derived from accelerating or slowing down the rate of putting the object into operation. This result is due to a growth of the national income connected with additional commodity output and to a reduction in the volume of unfinished capital investments when objects are put into service at a faster rate. The national importance of accelerating the commissioning of objects should also be taken into consideration from the point of view of the competition between socialism and capitalism.

Additional economic effects may also be obtained in a number of cases if the commissioning of a given enterpris contributes to the growth of the national income through allied branches and enterprises.

The damage inflicted on the national economy by extending the term of commissioning an object, which leads to lower commodity output and to an increase in incomplete capital investments, is determined analogously. The economic effect due to the reduction or increase of incomplete capital investments is calculated according to fixed normative coefficients of effectiveness.

If, in comparing project variants, it is found that the cap tal expenses for the variants are to be made at different times, then the variants should be compared by converting the expenses of later years to the present moment by means of dividing them by a coefficient that takes into account the average effect which may be derived in the given branch, provided the capital investments are employed efficiently.

If the capital investments in one of the project variants involve an increase in the volume of production, then the volume of capital investments, operating expenses, and other indices of effectiveness in both variants should be recalculated to equal production volumes. The possibility of expanding production and meeting additional demands offered by the new variant may be evaluated in terms of those capital investments which would have been required f attaining an equal productivity with the existing equipment:

When the realization of the planned variant results in a higher quality of output, then this should be reflected by a corresponding rise in the price of the commodity, if this is provided for in the form of supplements for quality.

The comparison and selection of new technical designs should be based on the best existing types of equipment which provide higher technical and economic indices if introduced under the given conditions. This best available equipment may be either in the development and test stage or if there is no such best designed equipment, it may be the best Soviet or foreign-made equipment already introduced in industry.

The economic effectiveness of the projects to be implemented should be determined by comparison with the indices of the equipment to be replaced. If the designing, introduction, and mastering of new equipment is to be done in the course of a number of years, account should be take of the possible changes of technical standards by the time the new equipment is to be introduced. In order to compar the indices of planned and actual capacities with different volumes of production, corrections must be made in the initial data, proceeding from the planned volumes of output for the given capital investments and changes in productio costs, only in case of changes in the volume of output.

There are other factors to be taken into consideration besides the calculation of effectiveness in value indices an in kind which lend themselves to quantitative measurement when comparing capital investment variants and selecting the most effective ones. These are such social factors as the improvement and lightening of labor conditions, which is of special significance in estimating the effectiveness of mechanization and automation, safety, the raising of the working people's cultural level and living standards. Special attention in comparing the variants should be devoted to considerations of the country's defense capacity.

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An examination of the actual effectiveness of previous capital investments is of great importance for the successful study of the economic effectiveness problem.

The investigation should be carried out separately for th capital investments made in the past (preferably within 1952-1958) and the capital investments to be made in the future, according to the seven-year plan.

The areas that should be investigated first of all are key industries: power engineering, fuel, iron and steel, the chemical industry, some branches of machine building, the construction industry, transport, and a number of enterprises forming part of these branches. The range and number of enterprises to be examined should be fixed according to the capital investments made in the examined branch. Newly built and reconstructed enterprises should be studied separately.

In the course of research it is necessary to establish the volume of capital investments in the branch as a whole and in each of the enterprises under examination for each year, including the investments made in the expansion of working capital, but not investments in housing construction. Then we determine the annual increase in net output in kind and in value terms, deducting that portion of it which is not due to capital investment but to a better utilization of the existing fixed capital. For each branch it must be determined which year's capital investment is connected with the given year's increase in production, or vice versa, which year's income in output is connected with the given year's capital investment. The gap between them must vary with the branches, depending on the time that should elapse from the beginning of construction or reconstruction and up to the moment when 75-80% and more of the planned capacity has been attained. An average coefficient of effectiveness for each branch and an individual coefficient of effectiveness for each enterprise can be established by comparing the production increase in value terms with the capital investments that have brought about this increase.

For conducting this research successfully it is feasible to analyze the following data for each enterprise:

(a) the effect of capital investments on the volume and rate of growth of production,

(b) the effect of capital investments on labor productivity and production costs of commodities,

(c) the effect of capital investments on the quality of product,

(d) capital investments per unit of output (with and without taking into account the capital investments made in directly allied branches).

The economic indices of the enterprise under examination should be compared with the corresponding indices of the average and best operating or projected enterprises of the same branch in the USSR, and, if possible, abroad. Thus, a study should be made of the extent to which production costs of a given commodity at the enterprises under review were lower or higher, as the case may be, than at the best or average enterprises throughout the branch, as well as the extent to which the capital investments per unit of output in the given enterprises were lower or higher than those in other similar enterprises of the given branch which had been erected prior to the construction of the enterprises under examination. Of course, the investigation should also answer the question of what were the factors which brought about the rise in labor productivity and reduced production costs at the enterprises, what factors resulted in the reduction or increase in capital investments per unit of output and of the periods of recoupment, etc.

Besides studying capital investment effectiveness in branches and enterprises as a whole, it is feasible to investigate the actual economic effectiveness of individual major technical developments giving rise to new kinds of production, new technological processes, production automation, etc.

The same range of industrial and transport branches should be covered in the investigation of planned capital investments as for the previous capital investments. These studies should also be conducted separately for the enterprise under construction and those being reconstructed.

In the course of research, along with establishing the effectiveness of previous capital investments, the effectiveness of the capital investments planned and being made in the current seven-year period of 1959-1965 should be determined as well. The volumes of planned capital investments should be compared with the planned production increases by branches as a whole and by the individual enterprise for every year. The total volume of capital investments for a given branch is established, and the branch coefficient of effectiveness is determined by comparison with the net increase in production in a corresponding year due to these capital investments. Individual effectiveness coefficients for each enterprise are also determined.

In those cases in which the output of different industrial branches serves to meet one and the same need of the national economy (for instance in fuel, a raw material, etc.), a comparative analysis should be made of the economic effectiveness of capital investments in these different branches (for instance, the mining and transportation of coal, natural gas, oil, peat, natural and synthetic kinds of raw materials, etc.).

When comparing the variants of meeting a given economic task set by the plan, for instance that of increasing the output of some kind of commodity by means of building an enterprise in one or another region or by means of building a single large or several small enterprises or by means of reconstructing and enlarging existing enterprises, etc., a comparison must be made of the magnitude of capital investments and production costs for the different enterprises or for other variants, and the periods of recoupment or coefficients of effectiveness of additional capital investments established. The indices obtained should be compared with the standard periods of recoupment or coefficients of effectiveness for the given branch. Besides, a comparison should be made of the effectiveness indices obtained according to designs with those of the best Soviet and foreign enterprises, in the same manner as has been recommended when analyzing the actual effectiveness of capital investments made in the past.

A number of problems involved in determining the effectiveness of the introduction of new equipment that might arise in the course of the investigation should be solved in conformity with the methods adopted. This, in particular, applies to problems of the use of comparable prices to compare planned capital investments with those made in the past, the use of conventional prices, the calculation of shipping costs, the use of indices that may change in opposite directions.

By generalizing the vast collected factual material and by using a precise method it will be possible to carry out the necessary measures designed to greatly enhance the effectiveness of capital investments which will be steadily increasing from year to year.

Nauchnye Doklady Vysshei Shkoly, Ekonomischeskie Nauk
Scientific Reports of the Higher School, Economic Series
1959, No. 1, pp. 45-53

M. Solodkov:

On Productive Labor Under Socialism

Productive labor as an economic category was thoroughly explored by Karl Marx. The concept of productive labor, as clearly illustrated by Marx, embodies, on the one hand, a general meaning (applicability for all social formations) and on the other, a specific meaning (special features at different stages of development of human society).

Marx deduced the general meaning of productive labor from the very nature of material production. Analyzing the labor process independently of its historical social forms, Marx wrote: "If we examine the whole process from the point of view of its result, the product, it is plain that both the instrument and the subject of labor are means of production, and that the labor itself is productive labor." (1)

With the development of the cooperative character of labor the concept of productive labor assumes an expanded meaning. During the transition from individual to cooperative production the product of labor is converted from a direct product of an individual producer into a product of the aggregate laborer, that is, into a social product. Hence, the foregoing definition of productive labor is inapplicable to each and every member of a production collective, taken separately, but always retains its meaning as applied to the aggregate laborer. It follows, therefore, that in order to participate in the production of the product it is sufficient for anyone to be a member of the aggregate laborer and accomplish one of his functions, related either to manual or mental labor. Enlargement of the productive labor concept, arising from the very nature of material production, does not change its substance. Productive labor, under all circumstances, continues to be the prerequisite for the existence of human society and the sphere of its operation is the production of material values.

The specific feature of productive labor is that this concept embodies socially definite economic relations. Productive labor appears as a socially defined labor. Thus, under capitalism productive labor is that which creates surplus value, ensuring the material foundation for expanded reproduction of capitalist relations of production. "Productive labor is but an abbreviation for the totality and specific character of that relationship in which labor power figures in the capitalist mode of production." (2) Marx wrote that a productive laborer under capitalism was a means for increasing capital, and to be one was hardly a joy but a curse.

Under socialism productive labor is that which directly ensures expanded reproduction of the aggregate social product, that is, labor which along with the necessary production produces the surplus product. This is what makes it possible to improve socialist production on the basis of the new technology and thereby satisfy the ever-rising material and cultural needs of the whole of society and each of its members. Productive labor under socialism creates the material foundation for expanded reproduction of socialist relations of production — relations of cooperation and socialist mutual assistance of people free from exploitation.

Under socialism productive labor as an economic category is fundamentally different in social content from what it is under capitalism. The socialist form of ownership and the economic laws of socialism change the character of social labor, the character of its socialization, thereby als changing the social content of the aggregate laborer.

The characteristic feature of capitalism is alienation of the different kinds of labor, including mental and manual la bor, which are distributed among different people. This finds its expression in the discrepancy, verging on antagonism, which develops between manual and mental labor. Mental labor, as a rule, is connected with the activity of th ruling classes, whereas physical labor is the life-long lot of the laboring masses. But the important thing here is no only the splitting up of the functions of productive labor inherent in the aggregate laborer under capitalism, but also that the aggregate laborer, as Marx puts it, is the living m chine for the production of surplus value.

Socialist ownership changes the character of social labo eliminates the gap between its diverse forms and creates the necessary prerequisites for combining mental and man ual labor as functions of productive labor. With the abolition of the antithesis between mental and manual labor, the aggregate laborer under socialism appears as a creative production team in which the interests of each and all are organically bound with the tasks of the whole of society.

A combination of the components of the aggregate labore should ensure high rates of growth of labor productivity. Therefore, the development of socialist production provide for changing and perfecting it. Hence, in the case of planned national economic development it is very important t determine the proper proportions between the functions of the aggregate laborer. Thus, management of the process production is a function of the aggregate laborer. But the still persisting practice of maintaining large staffs for supervising the process of production cannot be considere normal. Some economic councils employ 170 and more ad ministrative personnel per 1,000 workers (including plant trusts and offices of economic councils).

The task is to disseminate the experience of the leading economic councils which have promoted production by con solidating shops, abolishing the shop system in small plan merging small neighboring enterprises and building organ zations. Improvement in the combination of the componen of the aggregate laborer should follow the line of increasi the relative share of workers and engineering personnel, and reducing the role of administrative staffs.

The concept of productive labor as a labor creating material values helps to determine the borderline between th application of aggregate labor in the sphere of production material wealth and in the unproductive sphere.

In the sphere of material production both man and natur interact and the result is a product which directly or indirectly satisfies one or another need of man, either as a article of individual consumption or as a means of produc tion.

Both the branches which create a product as an alienate form of production and the branches wherein man directl consumes the product in the process of production pertai to material production. In the case of transport, for exa ple, human needs are satisfied directly in the process of production. The usefulness of transport lies in moving commodities and people, and that is precisely the material product of this branch of the national economy. Hence, the sphere of material production includes: industry, agriculture, construction, transport and communication, and that part of trade which continues the process of production (packing and wrapping goods, etc.) and other branches such as the scrap industry, purveyance of mushrooms, berries, preparing supplies of firewood and the like.

As distinct from the sphere of material production, people employed in the unproductive sphere perform functions associated with the consumption services of society (trade and the municipal economy). A part of the workers of the unproductive sphere are engaged in so-called spiritual production (the arts, culture, etc.). This unproductive sphere does not create any material values in the economic sense, although at first glance it may appear that the workers of this sphere do create material values: an author writes books, an artist paints pictures, a sculptor produces sculptures, and so on. However, the results of their activity are but a reflection of the processes of material life in the human mind. The author fully agrees with these Soviet economists who consider the characteristic feature of the material product to be its reproducibility and on this basis draw a distinction between works of art, as, for example, the products of the work of sculptors, writers, etc., and the produce of the branches of material production. In this sense the writer's labor does not create a material product, whereas the labor of a printing-shop worker is directed to creating a material product, since he does not only produce, but also reproduces a material product. A book, painting, sculpture and the like entail expenditure of paper, paint, canvas, gypsum or bronze. Labor in the sphere of material production makes for the creation of works of art. However, that is not the labor of the artist, author or sculptor.

The unproductive sphere includes: education, health services, art, administration, army, trade, municipal economy, etc. The labor of people employed in the unproductive sphere is unproductive labor.

In Soviet economic publications productive labor is often defined as labor expended in the sphere of material production. Such a definition is not quite accurate. In point of fact the sphere of material production also includes unproductive labor functions. This concerns, above all, the labor expended in bookkeeping (calculation of commodity prices, computations), which is but an ideal reflection of the material process of production, recording its circulation. This kind of labor does not create material values but merely reflects their production and movement in value form.

In the Soviet national economy millions of people are employed in this essential but unproductive sphere. At present, when computing machines are widely used and accounting in the national economy has been simplified, possibilities prevail for curtailing the category of bookkeeping personnel and of using them directly for the production of material values.

In addition to the extractive industry, agriculture and the manufacturing industry, Marx says, there is also a fourth branch of material production, namely, the transport industry, where, as in other branches of material production, the object of labor is subjected to a certain material change (in the sense of change of place). But in the case of transporting people, the labor of those engaged in accomplishing this function is only a service. (3) Consequently, the labor of transport workers, when expended on conveying people, unlike that expended on carrying freight, is not productive labor.

Hence, all labor expended in the sphere of material production cannot be equated with productive labor. Only that activity of workers in the sphere of material production is productive which is directly related to the creation of a product or to increasing its value, regardless of whether it is manifested in the form of manual or mental labor. But it must be a function of the aggregate laborer.

The practice of dividing the aggregate labor of society into productive and unproductive spheres does not give a full picture of the productive utilization of the labor power of society, since in the sphere of material production there also exist unproductive labor functions. We hold that it has to be supplemented by dividing the aggregate labor into productive and unproductive labor. Applied in practice, this division will bring to light considerable reserves of labor power in the sphere of material production and help to increase its productive application. The new system of calculating the productivity of labor per employed person will have a great influence on increasing the productive utilization of labor power.

However, the fundamental mistake in the interpretation of the category of productive labor under socialism is the notion that "every kind of labor in the sphere of material and spiritual production" is included in productive labor. (4) This error arises out of an incorrect interpretation of a number of Marx's theses on productive and unproductive labor. Thus, in *Theories of Surplus Value*, Karl Marx points out that under capitalism productive labor is that which is directly exchanged for capital. Let us clarify the point of whether labor in the unproductive sphere is exchanged for capital by referring to Marx. In his definition of the essence of the exchange of labor for capital Karl Marx writes: "Direct exchange between labor and capital in this case means:

"(1) direct conversion of labor into capital, into a materialized component of capital — *a transformation effected in the process of production*;

"(2) exchange of a definite quality of materialized labor for the same quantity of living labor plus an additional quantity of living labor, which is appropriated *without exchange*." (5) Consequently, no direct exchange between labor and capital takes place in the unproductive sphere. In his polemics with bourgeois economists Marx uses such definitions of productive labor as labor which is productive from the viewpoint of society and of the individual capitalist. Defining productive labor from the standpoint of the individual capitalist, he cites examples from the unproductive sphere. He speaks about writers, artists, teachers, actors, etc. whose labor is expended in the unproductive sphere and who at the same time may serve the purpose of enriching the proprietors. Since in form this labor appears as hired labor, Karl Marx calls it productive labor only conditionally. However, the two following factors should be borne in mind: first, unlike labor in material production, the life of society does not depend on labor in the unproductive sphere; second, it does not create the material conditions for expanded reproduction of capitalist production relations, that is, surplus value.

Nor should we leave out of account the fact that in a number of places Karl Marx underscores the provisional nature of the use of the term "productive labor" in relation to workers in the unproductive sphere. In *Capital*, Marx writes: "If we may take an example from outside the sphere of material production, a schoolmaster is a productive laborer when, in addition to belaboring the heads of his scholars, he works like a horse to enrich the school proprietor." (6)

Therefore, the explanation of productive labor should be founded not on this or that statement by Marx, but on the substance of his theory. According to the Marxist theory of productive labor, labor in the unproductive sphere is productive neither under capitalism nor under socialism.

Though recognizing division of aggregate labor into productive and unproductive, some economists refuse, without any good reason, to apply these categories under socialism. They argue that under socialism fundamental changes have taken place in the nature of social labor, that exploitation of man has been done away with. Ya. Kronrod writes: "In Marxist political economy they (the terms productive and unproductive labor — M. S.) are used to express not only the material content but also the social character of labor under capitalism. They express in this instance the very fact that under capitalism productive labor appears as exploited and antagonistically opposed to unproductive labor, whose functions are largely accomplished by the exploiters and their menials." (7) Hence, Ya. Kronrod is of the opinion that for socialism the division of aggregate labor into "materially productive labor" and "socially useful unproductive labor" is more correct.

It is quite true that under capitalism the economic categories of production and unproductive labor express a relation of exploitation of man by man. Under socialism these categories are imbued with a different social content. Therein lies the specific character of productive labor. However, the reason for dividing the aggregate labor of society into productive and unproductive labor is not only connected with the specific character of productive labor, but also with the very important circumstance that only the labor of workers in material production is a condition for the life of society. In repudiating the terms productive and unproductive labor, Comrade Kronrod manifests an inconsistency. He splits up the two sides of a dialectical unity which are embodied in the category of productive labor, namely its general meaning and specific meaning.

The economists who object to dividing the aggregate labor of socialist society into productive and unproductive labor say that such a division belittles the importance of labor in the unproductive sphere. But this is no reason for refusing to apply the categories of productive and unproductive labor in the political economy of socialism. This viewpoint arises out of the fact that when analyzing the distribution of the aggregate labor of society between the sphere of material production and the unproductive sphere our economic literature, as a rule, does not give adequate attention to determining the role and place of the unproductive sphere in the life of socialist society. In most cases the role of the unproductive sphere is merely said to reflect the direct process of production and to involve the consumption of the product created in material production. Furthermore, no account is taken of the mutual exchange of activity between workers in the productive and unproductive spheres. This mutual exchange of activity under socialism is designed to speed up the rate of development of the productive forces.

Under socialism the task of the unproductive sphere is to develop the physical and spiritual qualities of man, the fundamental productive force of society.

An important place in the unproductive sphere belongs to science. Upon its level depends the development of the productive forces, the growth of the productivity of social labor. In the present phase this dependence is especially marked; suffice it to mention the uses of atomic energy, automation, application of tele-mechanics, etc. It is no accident that our country, in which all the conditions for the development of science have been created, was the first to undertake the great historical step toward the conquest of the cosmos. Under socialism science promotes the material well-being and cultural advancement of the people; it serves the cause of peace, the cause of building a communist society.

Every given historical mode of production has its distinc division of labor between the sphere of material productio and the unproductive sphere. In the class-antagonistic societies the division of labor between the sphere of materia production and the unproductive sphere expresses the relations of dominance by an insignificant minority possessing the means of production over the laboring masses who hav been deprived of them. In these societies, as F. Engels says: "... any increase of the productive forces, extension of trade, development of the state and of law, the creation of art and science, was only possible by means of a greate division of labor. And the necessary basis for this was the great division of labor between the masses employed in simple manual labor and the few privileged persons directing labor, conducting trade and public affairs, and, at a lat stage, occupying themselves with art and science." (8)

In the class-antagonistic societies the task of the productive and unproductive spheres is largely to satisfy the parasitic wants of the ruling classes. Anarchy of production, economic crises, the enormous army of unemployed testif to the fact that capitalism, especially in the present phase of its development, is incapable of utilizing labor resource productively. In the present stage of capitalism, as a result of its decay and parasitism, the unproductive sphere grows chiefly through the state apparatus, the army and those branches which serve the whims of the ruling classe

Under socialism the relative share of the unproductive sphere is less significant, as a result of the abolition of the parasitic classes. Today 85% of the able-bodied populatio of the USSR is employed in material production and only 15% in the unproductive sphere. In the USA only about 60% of the gainfully-employed population is employed in the sphere of material production and roughly 40% is occupied in the unproductive sphere. Furthermore, socialism has eliminated the parasitic character of the unproductive sphere and placed it at the service of the people.

However, the ratio between the labor of people employed in the sphere of material production and the labor of peopl occupied in the unproductive sphere is determined not mer ly by the specific economic laws of this or that mode of production, but also by the level of development of the productive forces of society. If we were to compare countrie with a similar economic system we would find that the share of labor employed in the unproductive sphere is, as a rule, higher in the country in which the productive force are better developed. According to Marx: "A country is richer, the smaller is its productive population, given the same quantity of products, in relation to the unproductive population. For the relatively small size of the productive population would only be another expression of the relative height of the productivity of labor." (9)

With the development of productive forces society is abl to direct an ever larger quantity of labor to the unproductive sphere. This natural phenomenon is also manifested under socialism. Between 1940 and 1956 the number of pe ple occupied in the unproductive sphere of the Soviet Unio in relation to the total number employed in the national economy, increased from 12.1% to 14.8%. (10) This growth of the unproductive sphere stems from the increased number of people occupied in education, health se ices and in the cultural and utility services. The admini trative staffs have been curtailed both relatively and absolutely. In 1940, 1,825,000 were in government service occupied in economic management, compared with 1,342,0 in 1956, that is, a drop of 483,000. (11) The increased pe sonnel in the unproductive spheres of such branches as ed cation, health protection, cultural and utility services is natural only under socialism. The fundamental advantage of socialism compared to capitalism is that the structure of the unproductive sphere is basically different. In the Soviet Union over 60% of the labor in the unproductive sphere is accounted for by people employed in education and health services. In the capitalist countries the bulk of the labor in the unproductive sphere is occupied in trade, government service and in branches catering to the wants of the ruling classes. Thus, in the USA more than 50% of the personnel in the unproductive sphere in 1950 were in trade and government service. (12)

The development of the branches of the unproductive sphere is effected on the basis of the growth of productivity of labor in the sphere of material production. Under socialism the branches of the unproductive sphere, aiming at the development of the physical and cultural qualities of man, in their turn promote the growth of the productive forces of social labor. The changes in the system of education in the secondary and higher schools will set up still closer organic ties between the productive and unproductive spheres and ensure a high rate of development of the productive forces.

The historic 21st Congress of the CPSU mapped out a new vital period into which our country has now entered — the period of all-out communist construction. Having in mind a communist society, Karl Marx wrote: "... the realm of freedom does not commence until the point is passed where labor under the compulsion of necessity and of external expediency is required. In the very nature of things it lies beyond the sphere of material production. Beyond it begins that development of human power, which is its own end, a true realm of freedom, which can flourish, however, only upon this realm of necessity as its basis. The shortening of the working day is its fundamental premise." (13) Attaching great importance to the development of human powers, which is an end in itself, Marx emphasized that it was possible on the basis of a very high level of development of the productive forces. Hence, it is appropriate to ask whether the need will arise in a communist society to divide aggregate labor into productive and unproductive labor.

Notwithstanding that the development of human powers, that is the physical and spiritual qualities of man, will become an end in itself, the conditions of life in communist society, as in every other, will depend on the production of material values. "Just as the savage must wrestle with nature in order to satisfy his wants, in order to maintain his life and reproduce it, so civilized man has to do it, and he must do it in all forms of society and under all possible modes of production." (14) Consequently, labor as a process wherein man will regulate exchange of materials between himself and nature will remain under communism, as well as the division into productive and unproductive labor. But a high level of development of the productive forces, of man's physical and spiritual qualities will make it possible to overcome the now prevailing substantial distinctions between productive and unproductive labor. First of all, the division of labor which oppresses man will be done away with completely; the members of society will enjoy complete freedom in choice of occupation; the present distinctions between mental and manual labor will disappear. The functions of manual and mental labor will merge on the basis of a very high level of mechanization of labor. Man will become a creator in the full sense of the word.

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Ya. Kvasha and V. Krasovskii:

The Capital Output Ratio and Reserves for Reducing It

The rate of large-scale socialist reproduction is determined by the share of the national income that is turned into accumulation and by the capital-output ratio. A reduction of the capital-output ratio produces the same effect as an increase in the share of accumulation. The increase in output through a decline of the capital-output ratio requires a lesser mass of accumulation and, when the rate of reproduction is high, ensures an optimum relationship between the funds of accumulation and consumption.

Under present-day conditions the problem of the capital-output ratio is an important political and economic problem. The Communist Party attaches paramount importance to the most effective allocation of capital investment with a view to augmenting production capacities and swiftly increasing industrial output at lower expenditures of resources by sharply raising labor productivity efficiency and lowering production costs. What is meant by the reduction of the capital-output ratio is a growth of over-all production with less capital investment in the fixed and working capital. At its plenary meeting in June 1959, the Central Committee of the CPSU drew up a program of concrete measures to increase output and further expand production capacities by reconstructing and enlarging existing enterprises, replacing and modernizing outdated equipment, and introducing complex mechanization and automation to the utmost degree with a view to speeding up the growth of industrial production and labor productivity with the least expenditure of materials.

A matter of great interest in determining the most economical ways of expanding production is the trend of the capital-output ratio and the dynamics of this index.

For a long time it had been positively asserted in foreign economic literature that the capital-output ratio has a tendency to rise. Back in the thirties, two American researchers — C. Cobb and P. Douglas — established the "law" of declining effectiveness on the strength of statistics taken from the U.S. censuses of 1889-1922. Their concept became widely known, and in some of the works of bourgeois economists it was elevated to the rank of an absolute law of technical progress.

Some Soviet economists also pictured the growth of the capital-output ratio as an irresistible consequence of technical development. They tried to find theoretical ground for their supposition in Karl Marx's teachings with regard to the organic structure of capital and the more rapid growth of the first subdivision of social production. These investigators confused the physical and the value aspects of reproduction. It is true that owing to the introduction of new technology the value of fixed capital keeps steadily increasing in relation to the value of output. But from this it does not follow that the value of modern instruments of labor and the working capital needed to operate them are increasing in relation to the physical mass of output.

The dynamics of the capital-output ratio differ at different stages of technical progress and with varying rates of economic development. In present conditions the predominant tendency is toward a reduction of the capital-output ratio. It surmounts the various counter-tendencies that keep cropping up continuously.

On the whole, the capital-output ratio of social production depends not only on mechanization, technical progress, the dynamics of the value of the tools of labor, how intensively they are used, etc., but also on the branch structure of the national economy and the rate of its development. Therefore the economic analyst should draw a distinction between the capital-output ratio involved in the production of specific products (local capital-output ratio) and the capital-output ratio that applies to the national economy as a whole. The latter's dynamics are determined not only by changes in the capital-output ratio relating to separate products, but by their share in the total output of the national economy as well.

Not everyone recognizes the validity of the use of local capital-output ratio indices in economic calculations. Some point out that capital investment in any enterprise or branch of industry entails investment in associated branches (power, transport), calls for house-building, etc. For example, P. S. Mstislavsky suggests that only capital-output ratios o a national economic scale be used, which include all accompanying expenditures. Some of the economic calculations for power development projects reckon with the need to increase capital investments in related branches by prorating expenditures accordingly.

Taking stock of the capital expenditures in reciprocally related branches is, undoubtedly, an important problem of economic analysis and the planning of capital construction. Nevertheless, the index of the capital-output ratio relating to the production of separate products should not be neglected. This index, showing the historically-created divisio of labor in the national economy, allows one to distinguish the outlays directly concerned with the given branch from the total expenditures involved in the whole national economic cycle. It is absolutely essential to the drafting of industrial projects.

The history of economic development shows that the movement of the local capital-output ratio index is determined by counteracting forces and that the prevailing tendency at one stage may be to expand, while at another to shrink the capital-output ratio. At the present stage of economic and technical development, we can say that the main trend of the local capital-output ratio is to diminish. This trend may be traced in our own national economy, as well as in the industries of the capitalist countries. Let us examine the movement of the capital-output ratio in some of the different divisions of the economy of the United States, where statistics on production and capital are available for several decades on a national scale. The summary results of a study of the dynamics of the capital-output ratio in the USA are given in the table shown on the following page.

The figures for the past 70-80 years distinctly show a tendency toward the reduction of the capital-output ratio in all branches of material production in the United States. I

Capital-Output Ratio in Branches of the National Economy of the United States in the Period 1870-1953
(in constant prices)*

Year	Mining industry	Manufacturing industry	Agriculture	Railway transport
1870	0.72	—	—	—
1880	1.16	0.55	—	15.0
1890	1.36	0.73	—	9.91
1900	—	0.79	—	6.48
1909	1.80	0.97	6.76**	4.47
1919	2.30	1.02	6.67***	3.49
1929	2.14	0.89	5.68****	3.96
1937	1.36	0.74	5.89*****	4.82
1940	1.59	—	5.05	3.59
1948	1.34	0.59	4.53******	2.50
1950	—	—	4.56	—
1953	1.26	0.60	—	—

* Joint Committee Print, Productivity, Prices and Incomes, Washington, 1957, p. 94; A. S. Tostlebee, Capital in Agriculture: Its Formation and Financing Since 1870, Princeton, 1957, p. 101.

The capital-output ratio in the mining and manufacturing industries represents the relation of total invested capital to the value of the annual product at 1929 prices. Invested capital consists of the sum of fixed capital (including the value of land), with the deduction of the amortization fund, but with the addition of working capital (ready cash, material supplies, accounts payable). In U.S. agriculture the capital-output ratio represents the relation of the value of total physical farm capital (value of land, farm structures, machinery, livestock and reserves of farm produce) to the gross farm income at 1910-1914 prices.

The years chosen from the period 1870 to 1953 are those corresponding to the phases of expansion. Consequently, the fluctuations within each cycle have been eliminated from the series given in the table. The series show the long-term trends of the movement of the capital-output ratio.

** 1910
*** 1920
**** 1930
***** 1935
****** 1945

he mining and manufacturing industries the curve of the
apital-output ratio assumes a parabolic form: after having
noved upward for sixty years, the curve changed its direc-
ion between 1919 and 1929 and is now turning back to the
nitial level.

The figures given are not faultless. In the last two dec-
ides of the past century American firms largely evalu-
ted the fixed capital in their balance sheets at the full orig-
nal value, without deducting depreciation. The tax law
nacted in 1909 induced the firms to heavily depreciate their
ixed capital so as to reduce the amount of taxable income.
The American economist D. Creamer assumes that the 1919
ensus, unlike the earlier ones, shows as a rule not the full
alue of fixed capital but the residual value. The residual
alue of fixed capital at that time was roughly estimated to
e around 60% of the full value. Hence, the figures on the
alue of fixed capital during the period before and after 1919
re not quite comparable. This understates the capital-out-
ut indices for the second decade of the current century and
or subsequent years, as compared with the preceding peri-
d. The system of so-called "accelerated depreciation," as
vell as the wholesaling at half-price of the government-
wned war enterprises during the postwar years, had a similar influence on the index of the capital-output ratio. When appropriately adjusted, the curve of the capital-output ratio in U.S. industry straightens out noticeably after 1919. This, however, does not alter the fundamental trend in the dynamics of the capital-output ratio.

Quite interesting in this respect is the movement of the capital-output ratio in the mining industry. It would seem that here one would expect a progressive increase of the capital-output ratio owing to the depletion of developed deposits and the need to mine minerals at greater depths and in more remote fields. However, one should not lose sight of the fact that the very concept of the accessibility of mineral resources changed with the march of technical progress. Stagnant technology would indeed lead to a substantial increase in the capital-output ratio in the mining industry and, moreover, to a curtailment of mineral output. Professor Ramzin, the well-known power engineer, claimed in his assessment of power resources back in the twenties that if the United States kept extracting oil at the rate it did, it would risk exhausting all its petroleum deposits inside of ten years. But during the thirty-odd years that have passed since then, the oil resources of the United States and of the whole world have been growing, despite the rapid increase in oil consumption. Modern means of geophysical prospecting, deep turbine drilling, application of rock-pressure methods and the effective use of oil pipelines have made it possible to obtain oil in remote but highly-productive oil fields and to extract it from greater depths in the old oil areas. And with the aid of new-type excavating machines, highly effective open-pit methods of working coalbeds have been introduced in fields where, heretofore, coal had been mined only by sinking shafts.

The tendency toward a lower capital-output ratio is observed in the United States in all the main divisions of the mining industry.

Capital-Output Ratio in the Mining Industry of the United States
(relationship of the value of advanced capital to the value of production, in 1929 prices)*

Year	Bituminous coal	Oil and natural gas	Metallic minerals	Nonmetallic minerals
1870	0.91	1.86	1.31	—
1880	0.70	2.06	2.30	1.04
1890	0.69	3.76	2.73	1.16
1909	1.06	5.05	2.50	1.28
1919	1.25	5.86	2.16	1.19
1929	1.06	3.58	1.71	1.17
1940	0.88	2.26	1.24	0.94
1948	0.86	1.78	1.01	0.56

* I. Borenstein, Capital and Output in Mining Industries 1870-1948, Washington.

In 1948 the capital coefficient in the oil industry (the largest and most automatized of the extractive industries) dropped sharply to $1.78. Considering the relative caloric value of coal and oil and their thermal efficiency in the burning process, the differences in the capital-output ratio in the production of these two types of fuel level off. Calculations relating to 1949-1957 showed that the capital coefficient in the oil industry continued to decline.

Under the conditions created by modern technology, a transition to the development of poorer mineral deposits, whenever it does occur, does not necessarily increase the capital-output ratio in production. At the turn of the century copper was extracted in the United States from ores containing 5% metal; in 1953 the copper content averaged 0.8%, and ores with as little as 0.6% of copper were considered profitable. Nonetheless, the capital-output ratio in this field did not go up, and in the ore-mining industry as whole it has reached the optimum level in the last seventy years.

Data on the dynamics of the capital-output ratio in the various branches of the manufacturing industry in the United States show, in general, the same tendency that is observed in the mining industry: the continuous rise of the index up to 1919-1929, later changing to a rather swift decline. This is characteristic of both the old branches, suc as textiles, and of the relatively new ones that cropped up recently and developed swiftly, such as chemicals and tran port machinery (including automobiles and aircraft). Data on capital coefficients (the ratio of advanced capital to the value of production in constant prices) are available only only for four large divisions of the manufacturing industry and are given in the table below:

Year	Branches of industry producing chiefly:			
	Consumer goods	Building materials	Equipment	Raw and semi-processed products
1880	0.467	0.570	0.868	1.357
1890	0.619	0.773	1.059	1.655
1900*	0.681	0.944	1.052	1.691
1900**	0.692	0.801	1.055	1.695
1909	0.794	1.198	1.267	1.607
1919	0.860	1.329	1.218	1.695
1929	0.775	1.410	0.921	1.282
1937	0.614	1.109	0.929	1.071
1948	0.562	0.798	0.733	0.873

* Comparable with previous years.
** Comparable with subsequent years.

The curves showing capital coefficients in the manufacturing industry of Western Germany from 1925 to 1956, traced by R. Krengel, are analogous to the curves in the manufacturing industry of the United States, with the only difference being that the peak period in this case is 1930-1935, and not 1919-1929 as in the United States.

It is noteworthy that the reduction of the capital-output ratio is attained largely through the reconstruction and expansion of existing enterprises. For example, the U.S. steel industry now has 49 plants with a complete metallurgical cycle, and only one of them (in Morrisville, Pennsylvania) was built since the war. Consequently, the substantial increment of output capacities during the postwar period (and during the war) is accounted for not by the building of new plants, but by the reconstruction of old ones. It appears that in the given circumstances, reconstruction and modernization as a method of augmenting production capacities is much more effective than the building of new plants. Another factor that helped lower capital coefficients in the steel industry was the steadily growing supply of scrap iron, which enabled the United States to invest relatively smaller sums in iron mines, blast furnaces and coke shops. Suffice it to say that the difference between the annual output of pig iron and steel in the fifties was around 25 to 35 million tons. These two processes determine the reduction of the capital-output ratio in the steel industry.

Reconstruction and modernization, as well as new forms of industrial organization, are the principal factors lowering the capital-output ratio in many other branches of industry. Polls conducted in the United States in 1955 and 1958 by the economic department of the McGraw-Hill publishing house revealed that 68% of the canvassed firms expected to cover their outlays on modernization in five years or less. This group included 67% of the canvassed steel companies, 68% of the machine-building, 86% of the electrical engineering, and all 100% of the automobile companies. (1)

The cited facts refute the "theory" of declining productivity; they indicate that in the present phase of technical advancement the sum of industrial capital in relation to a unit of production tends to diminish in most branches of industry. Under capitalism this tendency manifests itself in contradictory forms and its effect is limited. As comrade N. S. Khrushchev said in his speech at the June Plenum of the Central Committee of the CPSU: "Capitalists are not always interested in further technical progress. They often buy patents and pigeon-hole them so as not to have to renew their industry, as this would call for a renewal of capital." In a socialist society there are all the objective potentialities needed for the full realization of the most progressive technical and economic trends. The steady decrease of the capital-output ratio in social production as a whole, as well as in its leading branches, provides favorable conditions for raising the productivity of social labor and for increasing the volume of production without additional capital investment. This is one of the principal potential factors in accelerating the pace of communist construction and winning time in the economic competition with capitalism.

The indices of the capital-output ratio (or, the yield of industrial capital) have been calculated by a number of analysts on a scale embracing the whole industry of the USSR, as well as for its separate divisions. On the basis of these computations it is possible to work out comparable values of the capital-output ratio for total industrial production over the past thirty years — from 1925-1926 to 1956, inclusive.

Dynamics of the Capital-Output Ratio in Soviet Industry from 1925-1926 through 1956
(ratio of fixed capital to a ruble's worth of gross output per year)*

Year	In rubles	In percentage of:	
		1928	Previous year
1925-1926	0.83	166	100
1926-1927	0.74	148	89
1928	0.50	100	68
1932	0.60	120	120
1937	0.60	120	100
1940	0.60	120	100
1945	0.64	128	107
1950	0.52	106	83
1955	0.49	98	92
1956	0.49	98	100

* Fixed capital and gross output are figured here in comparable prices (1926-1927). The calculations for 1925-1926 are based on the data given by G. Demirchoglian and Ia. Kvasha in their article "The Use of Fixed Capital in the Manufacturing Industries of the USSR," (The Statistical Review, No. 3, 1928), and for the period 1928-1956 on the data contained in S. G. Strumilin's book on The Economic Effectiveness of New Technology, 1958. The calculations embrace all of industry, including mining.

The industrial upswing during the restoration period was due chiefly to an accretion of working capital and a more intensive utilization of available equipment. This had the effect of sharply lowering the capital-output ratio between 1925 and 1928. The growth of the capital-output ratio from 1928 to 1932 and its subsequent stabilization reflect the specific conditions that prevailed during the speed-up of industrial reconstruction and in the initial stage of mastering new technique.

The rate of industrial expansion in the Soviet Union is much higher than in any industrially advanced capitalist country. This has a great influence on the relationship between productive capital and the volume of output, and on the dynamics of the capital-output ratio. When reproduction grows at a fast rate, the contribution of new enterprises recently commissioned, but not yet operating to their full capacity, is relatively large. Another factor that has had an important bearing on the capital-output ratio is that most of the new enterprises were overburdened with much unfinished construction work to be done before their second and third sections were ready to produce. All this must be taken into account when comparing the dynamics of the capital-output ratio in the USSR with those in the advanced capitalist countries. During the postwar period, the capital-output ratio in Soviet industry slowly but steadily diminished. The index number of fixed production capital in industry (1940 representing 100) was 154 in 1950 and 264 in 1955. The index number of the gross output of all industry was, correspondingly, 173 in 1950 and 320 in 1955. Hence, the capital-output ratio involved in total industrial production dwindled from the 1940 standard of 100 to the index figure of 89 in 1950, and 80 in 1955. In the prewar period the tendency, after the first five-year plan was launched, was just the opposite: the fixed production capital in industry and construction increased 8.2 times between 1928 and 1940, and gross industrial output — 6.6 times.

Notable success has been scored in lowering the capital-output ratio in various fields of our national economy. In the absence of comprehensive data that would allow us to compare the capital-output ratios involved in various branches of industry over a long period, we may examine the materials characterizing the movement of this index for those periods within which it is possible to calculate fixed capital of particular industries in comparable prices.

In the steel industry capital investment per unit of output is decreasing despite the fact that some of the newly developed deposits of iron contain relatively poor ore and are remotely located. According to the estimates of Gipromez (2), capital investments per unit of output in the group of steel mills under construction (not counting the investments in the development of fuel and raw-material bases) are a good deal lower than the investments in existing enterprises. The authors of the projects explain this as being due to the use of more modern equipment. The Gipromez calculations likewise confirm the effectiveness of reconstructing existing mills. It is particularly great with respect to those mills that had been built on the assumption that their capacities would later be expanded (i.e., when additional, seemingly unjustified, outlays had been originally made during the construction of the first section on transport and communication lines, etc., for the second and subsequent sections).

V. Khlebnikov observes that the construction of the largest and most effective steel plants under the provisions of the current seven-year plan will lower capital investments per ton of steel output capacity from 3,285 rubles (which was the average in 1952-1958) to 2,838 rubles during 1959-1965, or by 13.6%. Capital expenditures per unit of capacity of metallurgical and coke plants (not counting the third stage of the metallurgical cycle) will be reduced by 21.3% as compared to the preceding seven-year period. (3)

In non-ferrous metallurgy the expenses involved in the development of ore mining account for about 75% of all capital investments in this industry. In the production of non-ferrous metals, which is developing at a rapid rate, capital investment per one ruble's worth of output is very high, and runs to 3-3 1/2 rubles. It is all the more noteworthy that the present tendency is toward a reduction of capital expenditures per unit of output in all subdivisions of this industry. It is estimated that under the current seven-year program capital investment per unit of output will be reduced as compared to the preceding seven-year period of 1952-1958 by 20% in the production of aluminum, 25% in copper, 20% in lead and zinc, and 30% in nickel. (4) As in the mining of coal and iron, a considerable reduction in the capital-output ratio will be attained by switching more to the open-pit working of non-ferrous ores. By 1965 around 65% of the total output of non-ferrous metals will be obtained by open-pit mining. In the ore-dressing process, capital expenditures per unit of output will be lessened by enlarging the dressing plants, applying new technological methods and using less water (an important factor in the water-short areas of Kazakhstan and Central Asia). And finally, a substantial reduction in the capital-output ratio will be attained in the final phase of the metallurgical cycle. For example, the progressive suspension method of melting copper cuts the cost of a refinery by 15%.

The decision of the 21st Congress of the CPSU giving priority to the construction of thermal electric power plant will have a favorable effect on the dynamics of the capital-output ratio in the electric power industry. Capital investment per unit of output in hydroelectric plants is almost four times higher than in thermal plants. It is obvious that the shift of capital investment chiefly into thermal plants will sharply diminish the capital-output ratio in the power industry. It is also possible to substantially lower the cost of installed kilowatt capacities of both the hydroelectric and the thermal electric power plants. With respect to the latter, the capital-output ratio can be reduced by enlarging th thermal power plants, increasing the parameters and capacity of the boilers and turbines, applying the boiler-turbine block system, and using oil and gas for fuel whenever expedient. This cuts the cost of installed kilowatt capacities by 20%.

According to L. Melentiev and E. Shteingauz, capital investment in relation to a kilowatt of installed capacity amounts to 540 rubles in a 500,000-kw. power station, 390 rubles in a one million-kw. station, and 280 rubles in a giant station of 2,400,000-kw. capacity. They maintain that the doubling of an electric power station's capacity lowers the cost of its construction by approximately 15-20%. (5)

The building of powerful thermal stations with giant turbo-generators by the method of installing large pre-assembled units considerably cuts the cost and shortens th time of building and installation work. The construction of electric power stations of the open and semi-open type substantially reduces the capital investments per unit of output.

The data relating to the plans and projects in the leading branches of industry thus show that local capital-output ratios tend to diminish.

The specialization and concentration of industry, the reconstruction of enterprises and modernization of equipmen the integrated mechanization and automation of production processes, the introduction of progressive technology and constant improvement of industrial organization, the use o new materials and the other factors bearing on the reduction of the capital-output ratio, prevail in the other branches of industry as well.

These trends in local capital-output ratios, along with changes in the branch structure of industry, predetermine the movement of the capital-output ratio in industry as a whole. It is therefore necessary to find out what effect the structural changes have: Do they increase or decrease the proportion of industrial branches with high or low capital-output ratios? This question is important because of the radical changes taking place in the branch structure of industry and because the differences between branches in capital expenditures per unit of output are so great.

The magnitude of fixed capital per ruble of gross output depends chiefly on where the respective industry fits into the chain of the successive processing stages through which the initial raw material passes. According to the authors' calculations, the coefficients expressing the relation of the value of fixed capital to the value of gross output in various divisions of industry in the USSR in 1957 were as follows: (6)

Mining	1.89
Lumbering	0.64
Manufacturing	0.48
of which, those manufacturing:	
Industrial raw materials	0.79
direct products of the extractive industry	1.14
processed products of the extractive industry	0.54
Agricultural produce	0.17
direct products of agriculture	0.21
processed farm products	0.13

The extractive industries, those that use no raw materials, and the power plants show the highest indices of the capital-output ratio; and conversely, the relation of the value of capital to the value of production is comparatively low in the manufacturing industries that turn out finished products. Hence the movement of the capital-output ratio in industry as a whole, insofar as it is influenced by structural changes, is determined primarily by the relative proportions of the extractive and manufacturing industries and the rates of their development.

Under the current seven-year plan, the development of the mining industries, particularly oil, gas, iron and nonferrous metals, is being speeded up. This will somewhat raise the proportion of the fixed capital of these branches. The share of the mineral-processing industries (steel, nonferrous metals, etc.), the capital-output ratio of which is likewise high, will also rise. On the other hand, the upsurge of agriculture is stimulating greater output by the enterprises concerned with the processing of farm products and by other industrial branches of Subdivision II, in which the capital-output ratio is generally low. The machine-building industry, which accounts for approximately one-fourth of total industrial output, with a capital-output ratio close to the average for all industry, retains its relative proportion.

Of considerable interest is the measure of the capital-output ratio in the divisions of industry that differ with respect to the economic function of their output — the branches that turn out means of production, and those that make consumers' goods. The 1957 estimates of the capital-output ratios are indicated in the table which follows.

Output of means of production	0.90
of which:	
Tools of labor	0.62
Objects of labor	1.00
fuel and power	2.26
raw stuffs and materials	0.70
Output of consumers' goods	0.18
of which:	
Food products	0.19
Fabrics, clothing and footwear	0.14
Household commodities and articles for cultural needs	0.27

The capital-output ratio in the industries producing means of production is much higher than in the branches that produce consumers' goods. Though giving priority to the production of capital goods, the target figures of national economic development during 1959-1965 and the preliminary projections of the over-all plan provide for the development of Subdivisions I and II at a more equal pace. These changes in the structure of industrial production tend to lower the general industrial level of the capital-output ratio.

Agricultural production involves a high capital-output ratio, as do those divisions of the national economy that do not use raw materials. In the United States, the capital coefficient in agriculture reaches 4-5, whereas in the manufacturing industry it is close to 1.

In the USSR, capital investments in agriculture grew for a long period much faster than the increase in farm production. Between 1928 and 1955 fixed capital in agriculture (excluding livestock) increased by 360%. From 1950 to 1955 the fixed capital of farms went up by 80%, but during the same period the output of grain increased by only 30%, sugar beets — 50%, and raw cotton — 10%. It should be borne in mind that in 1955 (the last year under comparison) weather conditions in the eastern parts of the country were unfavorable. This should be taken into consideration when analyzing the growth of agricultural production during the period in question. However, the main reason why the returns on capital investment in agriculture were so small was the lag in collective and state farm production until 1953. Another reason was that capital investment in agriculture was channeled chiefly into primary mechanization, and the main effect of this was the release of manpower for use in industry. The measures outlined by the Central Committee of the CPSU at its plenary session in September 1953 and in later party decisions aimed at stimulating agricultural development abruptly changed the dynamics of farm production. At present crop and livestock production is growing at a swiftly increasing rate and, in consequence, the returns on fixed capital are growing likewise.

Transportation and communication constitute another major field of production and here the relation of the value of output to capital is highest of all. Fixed production capital involved in transportation and communication increased by 5.8 times between 1928 and 1955, whereas the freight turnover (in all means of transportation) increased by 9.8 times, and the number of dispatched letters and telegrams — by 7.2 times during the same period. Consequently, the capital-output ratio in transportation and communication was cut by about one-half. This was attained chiefly by making the fixed capital carry a heavier burden.

The movement of the capital-output ratio index with respect to the whole national economy may be shown by comparing the dynamics of fixed production capital in the national economy with the dynamics of the national income (in percentage of 1928):

Year	Fixed production capital in all branches of the national economy	National income
1940	445	510
1950	592	845
1954	875	1,280
1955	970	1,440
1956	1,090	1,610

Despite certain deficiencies in estimating the physical magnitudes of the national income and fixed capital, the trend of the capital-output ratio in the whole national economy (in terms of net production) appears quite clear.

Of great significance in long-term planning of the national economy are the relation of capital investments to the increase in national income and the dynamics of this index. Also of interest is the computation of the coefficient of the capital-output ratio involved in the production of subdivision II, for it indicates the amount of capital investments in all branches of the national economy that is necessary to raise the production of consumers' goods to the predetermined quantities. It is important to analyze the dynamics of this index so as to be able to scientifically plan an improvement in the Soviet people's standard of living. The enormous sums invested in heavy industry are not contributing to a fuller satisfaction of the people's material and cultural requirements: more manufactured goods and foodstuffs are being produced, more houses are being built, transport and communal services are steadily increasing, and the network of cultural and health institutions keeps expanding. The reduction of the capital-output ratio in all spheres of material production and the growth in returns from capital investments in heavy industry are shortening the time needed by the Soviet Union to attain the highest living standard in the world.

What are the potential ways of reducing the capital-output ratio in the national economy? This question calls for urgent attention in the light of the tasks posed by the 21st Congress of the CPSU and by the June 1959 Plenum of the Party's Central Committee.

The following ways of reducing the capital-output ratio may be provisionally projected:

(a) by progressively changing the branch structure of the national economy, in particular the branch structure of industry,

(b) by automating production and introducing new techniques,

(c) by speeding up capital construction, lowering its cost and improving its structure, and

(d) raising the standard of industrial organization and the skill of personnel.

The branch proportions of the developing socialist economy are not stable; they are mobile, and their planned rearrangement should be based on economic calculations that necessarily compare the capital-output ratios involved in the output of various products. The idea is not merely to compare the capital-output ratios of interchangeable products (coal and oil, cotton and flax, etc.), but to choose the most progressive directions in which to develop the national economy, for example: preferential expansion of the output of synthetic materials that can be substituted for natural raw materials, the introduction of progressive methods of thermal and chemical processing, the shaping of metal by pressure rather than by machine technology, etc. A factor which is greatly conducive to the future reduction of the capital-output ratio in industry as a whole is investment in such fields as organic synthesis, radio electronics, metallurgy of light metals and semi-conductive materials, jet-propulsion engineering and other fields which condition the development of new branches of industry that are highly effective in stimulating and speeding up the rates of development of the entire national economy.

Great potentialities for lowering the capital-output ratio in all branches of industry lie in the integrated mechanization and automation of production. The resolutions of the 21st Congress of the CPSU stress the importance of integrated mechanization and automation as the principal means of further technical progress in the national economy, whic is the mainspring for raising labor productivity, reducing production costs and improving the quality of production. Automation sharply raises the productivity of labor and, at the same time, lowers investment in production capital. Professor Shaumian contends that the main tendency of integrated automation — to break the old, conventional, habitual methods of production and develop new, progressive technological processes — produces results directly opposite to the so-called trend of declining effectiveness. (7) Another automation expert, V. Trapeznikov, a corresponding member of the USSR Academy of Sciences, maintains that "the expansion of industrial capacity through automation requires 5-10 times less capital expenditures than the construction of additional non-automated enterprises." (8) There is much data and factual material for different branches of industry which show that modern forms of automation favorably influence the movement of the capital-output ratio.

The high efficiency of automation does not rule out the possibility that the manufacture of a commodity with automatic technology on an entirely new technological principle will at first increase the capital-output ratio, for the inevitable outlays connected with the introduction of revolutionizing tools of labor often outbalance the advantages of the new process for a certain length of time. This is due to the technical overlapping of associated production processes in which the newest techniques mingle with the old, to occasional defects in the first sets of the new complex machines, to the inadequate skill of those learning to operate the new machinery, etc. An example of such overlapping of old and new is offered by the modern atomic power plant in which, alongside with the atomic reactor, you have the usual equipment of a thermal power station (steam boiler — turbine — electric generator). But even where there is such a combination of old and new types of equipment it is possible to substantially lower the capital-output ratio through technical improvements. It has been estimated by some foreign researchers that capital expenditures per kilowatt of capacity will drop from 130 pounds sterling in 1960 to 90 pounds sterling in 1975.

However, the capital-output ratio often rises when automation is introduced without being first checked by economic calculation. At its June plenum, the Central Committee of the CPSU emphasized the importance of economic calculation when it pointed out: "Some enterprises are creating costly machines, automatic transfer lines and other complex assemblies and mechanisms, the use of which doe not give a tangible economic effect... In many cases the steps taken to introduce new machines, particularly in connection with mechanization and automation, are taken without a preliminary analysis of their effectiveness." The Central Committee noted, therefore, that in devising and introducing new technical equipment, one of the important co ditions is to see that the period of recoupment of capital ir vestments is shorter than in other types devised by Soviet or foreign scientists and engineers.

Another requisite for lowering the capital-output ratio i to improve the structure of capital construction by increasing the proportion of the fixed capital's active component (the operating, powering, transporting, controlling and reg lating machines and devices). As one can see from the practice of industrial construction in the United States ove the past several decades, there is a marked tendency there to reduce the proportion of building work and, accordingly, increase the proportion of equipment. In the manufacturin industry of the United States the expenditures on equipmen in relation to total investments rose from 48.3% in 1929 to

65% in 1955. The share of equipment expenditures in total capital expenditures in U. S. industry is now approximately 50% higher than in the USSR. To some extent this gap is explained by the comparatively small scale of new construction in the United States, the movement of industry to the southern states where conditions are more favorable for the use of lighter buildings, and to certain differences in the statistics of capital construction in the USSR and the United States. Taking all this into account, the actual gap between the active components of fixed industrial capital in the USSR and the United States is nevertheless very substantial and is approximately 10-15 points. This is partly because of the comparatively high level of organization of construction in the United States. But the main reason why the ratio of equipment in fixed industrial capital is higher in the United States is that the equipment in American enterprises is arranged more compactly, owing to the use of compounded units of machinery and chemical apparatus, and of a continuous hook-up of production lines. The floor-space and volume of an industrial building can be used to greater advantage when the equipment is arranged rationally.

The realization of the Central Committee's decisions calling for the maximum distribution of industrial installations on open grounds when building new enterprises or reconstructing old ones, and for the replacement and modernization of outdated equipment, will help to increase the proportion of the active components of fixed capital in the total sum of fixed industrial capital. It is also necessary to eliminate the hypertrophy of partly built, but unfinished, second and third sections of newly commissioned enterprises. The great sums frozen in unfinished buildings lower the effectiveness of the operating part of the fixed capital of enterprises.

The improvement of industrial organization has an important bearing on the reduction of the capital-output ratio. It is most obvious that if industrial machinery is loaded more extensively, i.e., is kept running for more shifts (or hours), it will turn out more goods with the same amount of fixed capital, other things being equal. In many cases this reserve cannot be brought into play because of imperfect organizational structure of the enterprise, when disproportions between different parts of an enterprise cause bottlenecks. Improved cooperation in industry would clear the way for the more extensive use of different groups of equipment at enterprises. In some industries, particularly in machine-building, work usually lasts 1 or 1 1/2 shifts, and here it is quite possible to effectively prolong the work of the equipment to two full shifts.

A similar effect can be achieved by extending the period of seasonal work in certain branches of industry and construction. In the food industry this can be done by reconditioning the storage and processing of raw products so that they could be kept longer in storehouses and in distant transportation.

Although the effect of running machinery longer has important bearing on the volume of the capital-output ratio, it cannot be compared with the effect of increasing the productivity of mechanical equipment. A factor of paramount importance is that of improving the organization of production and of raising the skills of workers, technicians and engineers. Higher returns from fixed capital also depend on better factory management, quicker repair work, less stoppage and idleness of machinery, and the choice of optimum technological conditions. To improve the utilization of fixed capital, it is highly important that inter-factory connections be smooth and efficient and that the flow of materials and supplies be radically improved.

Throughout the years of industrialization, the USSR has gained vast industrial and technical experience, the general and special technical education of the workers has reached a far higher standard, scientific research has been extended into all fields of production of material values, the general schools have introduced polytechnical training, and an extensive network of amateur engineering circles has been organized for school children in their numerous clubs and societies. All this produces an enormous potential of advanced knowledge and skill, and its application is already contributing to a tremendous growth of production through more efficient use of machinery and equipment.

In the course of the nation-wide socialist competition for the fulfillment of the seven-year plan ahead of schedule, the workers in various branches of industry keep finding and realizing new potentialities for increasing output without additional capital investments, chiefly through integrated mechanization and automation, the modernization of antiquated equipment and the introduction of technical innovations. The examples shown by the workers, industrial managers and party organizations in the Vladimir and Sverdlovsk regions and other economic administrative areas show that fuller and more rational utilization of the potentialities of modern technology makes it possible to sharply increase the productivity of labor and the volume of output with relatively small capital outlays for the technical modernization, reconstruction and partial expansion of industrial enterprises. In the drive to complete the seven-year plan ahead of schedule it is highly important to eliminate the practice of dispersing capital investments very widely and to shorten the time spent on construction. This would enable new enterprises to go into production much sooner.

At this stage of technical progress, it is the objective trend of economic development to lower the capital-output ratio involved in production. The socialist system affords the maximum opportunity for taking advantage of the progressive tendencies of economic development in order to more fully satisfy the people's material and cultural requirements. A rational utilization of the possibilities for reducing the capital-output ratio in industry and other fields is one of the essential prerequisites for the speedy attainment of the Soviet Union's main economic objective — that of building the material and technical foundations of communism and of raising the living standard in our country to the highest level in the world.

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G. Khudokormov:

Utilization of the Law of Value in Planning Procurement Prices for Collective Farm Produce

Correct, scientifically-substantiated price fixing for collective farm produce is extremely important for furthering the economic relations between town and country and for ensuring the profitability of collective farm production. In the hands of the Soviet state prices are a powerful instrument for exercising planned influence on socialist economic development.

In establishing prices for collective farm produce careful account should be taken of the necessity of raising productivity of labor and expanding production on the collective farms as well as creating accumulation for the further advancement and improvement of industrial production, especially of heavy industry. Hence, price fixing for collective farm produce is designed to properly coordinate the interests of the state and the collective farms, the interests of the working class and the peasantry and to consolidate in every way possible the inviolable unity of the friendly classes of socialist society.

Under socialism there is no spontaneous play of prices. Procurement prices for collective farm products are planned by the state. Price planning has to reflect the operation of economic laws of socialism and, what is especially important, take into account the requirements of the law of value.

The law of value, operating in the sphere of commodity circulation through the mechanism of prices, requires that prices should coincide with value. This, however, does not mean that the price must coincide with value in every item. Under the impact of demand and supply, prices of commodities deviate from value, and this is one of the manifestations of the operation of the law of value. In socialist society deviation of prices from value is not spontaneous but arises out of the national economic plan. The requirements of the law of value on the compulsory character of prices coinciding with value are expressed in the constant conformity between the sum of prices for all commodities and the sum of values. Only in this way is exchange of commodities possible on the basis of the quantity of socially necessary labor expended on their production, which is effected for the whole of the national economy.

The necessity, in fixing prices, to reckon with value and the ratio between demand and supply shows that the law of value under socialism does, even if only partially, regulate prices. However, in socialist society the law of value is not an unlimited and spontaneous regulator of prices. The socialist mode of production is characterized by a considerable restriction of the regulating role of the law of value. This restriction is effected by planning prices for commodities in accordance with the requirements of the economic laws of socialism and, in the first place, with the basic economic law and the law of balanced (proportional) development of the national economy.

Consequently, the objective basis for restricting the regulating role of the law of value in the sphere of circulation is the operation of the basic economic law of socialism and the law of planned development of the national economy. Thes laws give rise to the possibility and necessity of restrictin the operation of the law of value, which is realized in the process of planning prices. The more accurate the planning of prices, the more effective is the restriction of the regulating role of the law of value. However, restriction o the operation of the law of value does not prevent its use i the practice of planned price fixing. The planning of price which in itself is a factor in the utilization of the law of value, appears as a mechanism for its implementation.

In establishing prices for collective farm produce the Communist Party and the Soviet government always take i to account the operation of economic laws, including the la of value, bring out the discrepancy arising between prices and their objective planning basis, and systematically impro the system of planned price formation, creating thereby favorable conditions for profitable collective farm manage ment.

The rise in procurement and state purchase prices for a number of agricultural products since 1953, that is, before the introduction of the new uniform system of state procurements of agricultural produce, is an example of how t system of planned price formation is being improved. The increase in procurement and state purchase prices has bee a powerful stimulus to the growth and improvement of collective farm production. As a result of the higher prices for agricultural produce, the annual income of collective farms and collective farmers increased by more than 50 billion rubles between 1953 and 1958. This enabled collective farms to increase allocations to the indivisible funds, to improve the well-being of collective farmers and to enhance the skills of cadres. To a certain extent this has been responsible for an average annual increase in grain output by 38%, potatoes by 11%, and other vegetables by 42 in the five-year period 1954-1958 as compared with the pr ceding five-year period. Production of meat (in slaughter weight) in 1958 increased by 35%, milk by 58%, and so fort compared with 1953. This has resulted in a substantial increase in state procurements of agricultural products. P curements of grain by December 10, 1958 increased by 91 including wheat by 131%, potatoes by 30%, vegetables by 80%, meat by 62%, milk by 105%, eggs by 76%, etc., as against 1953.

However, until quite recently the application of economi laws in planning prices was not quite sound scientifically. The requirements of the law of value in planning prices fo collective farm products were largely applied indirectly. Prices were established without an accurate analysis of t material and labor expenditures for one or another agricu tural product, because of the absence of production cost ca culations for collective farm produce. Only the signs test fying to some sort of violation of the principle of material incentive for collective farms and collective farmers indicated the necessity for improving the system of procurement and state purchase prices for collective farm produ

Production costs have now become a sound scientific basis for planning prices of collective farm produce. Planning prices on the basis of production costs has made it possible for collective farms to compare expenditures of resources with the results of production, and to work efficiently for the profitability of the commonly-owned economy.

The plurality of prices for the farm produce delivered to the state also handicapped the task of establishing prices on a scientific basis. The uniform procurement prices for collective farm produce provided for by the June decision (1958) of the Plenum of the CC of the CPSU eliminate this shortcoming.

The object of establishing uniform procurement prices is to ensure a fuller and more flexible realization of the requirements of the economic laws of socialism, including the law of value, a broader and more thorough application of the principle of material incentives in the development of the commonly-owned economy by the collective farms. These prices are designed to ensure a more rational accumulation of resources for the expansion not only of collective farm but also of industrial production.

The decisions of the June (1958) Plenum of the CC of the CPSU point out that procurement prices for collective farm produce must compensate for the expenditures of collective farms, proceeding from the average regional conditions of production, growth of productivity of labor, reduction of production costs and the creation of the necessary accumulation for expanded socialist reproduction.

The establishment of uniform procurement prices is conditioned by the requirement of the law of value — the necessity of levelling individual expenditures for production of output with the socially necessary expenditures. Furthermore, the multitude of prices and the many premiums (extras) for technical crops delivered over and above the plan placed the collective farms on an unequal footing. The typical and the lagging farms which produced technical crops sold a relatively large part of their products at basic procurement prices and a lesser share at premium prices. Things were more or less the same in the case of collective farms producing grain, potatoes, vegetables, and animal products. The share of the produce sold at higher prices by the weaker farms was considerably less than that of the leading collective farms. The bulk of their produce went as obligatory deliveries for prices which at times did not even cover production expenditures. This adversely affected the process of reproduction in the typical and especially in the lagging collective farms.

The establishment of uniform prices and abolition of premiums levelled out conditions for all collective farms.

It should also be borne in mind that the share of products sold by collective farms as obligatory state deliveries at fixed prices has sharply declined since 1953. While in 1950 the share of collective farm obligatory potato deliveries in the Lenin district of the Moscow region in total marketings to the state (obligatory supplies, state purchases and payment in kind for work done by the machine and tractor stations), was 55%, in 1957 it was only 14%. The share of obligatory vegetable deliveries dropped respectively from 99.9% to 20%, meat from 97% to 21%, milk from 95% to 10%, eggs from 100% in 1952 to 26%, and so on. The share of sales at state purchase prices increased in the case of potatoes to nearly 64%, vegetables to 69%, meat to 62.5%, milk to 79% and eggs to 74%. Now that the share of obligatory deliveries has declined it is expedient to maintain a uniform price for collective farm produce.

The introduction of uniform prices for collective farm produce also resulted from the reorganization of the MTS and the abolition of payments in kind for their services. These payments played a big part in the over-all procurements of farm produce by the state. The sale of agricultural machinery to the collective farms and the abolition of payments in kind entailed a considerable increase in the realization of market produce, for the state could not reduce the gross volume of its procurements.

Payment in kind could either be replaced by obligatory deliveries at fixed procurement prices or sales at state purchase prices. The fixed procurement prices for obligatory deliveries, established on a far lower level as compared with state purchase prices, did not ensure the necessary income for the collective farms. The Central Committee of the Party decided that instead of payments in kind the collective farms would sell their produce to the state at uniform prices based on state purchase prices, so that they would cover material and labor expenditures and ensure a definite net income for the collective farms.

Some economists hold that prices should fully correspond to expenditures of social labor on the production of commodities. This presupposes the distribution of the value of the surplus product in proportion to the expenditure of human labor. This viewpoint is wrong, for it ignores the limitations of the regulating role of the law of value in commodity circulation and gives unjustified advantages in price formation to branches of the national economy with lower organic composition of capital, such as agriculture as compared with industry. This would adversely affect the amount of accumulation for industrial development, especially of heavy industry, handicap technological progress and retard the technical advancement of labor.

A method of price formation which starts from, as an initial price level, the planned level of branch production costs and the distribution of the net income in proportion to these, is economically more sound. This principle envisages a price level below value for farm produce, including collective farm products, since collective farm production has a lower organic composition of capital then industry. It should, however, be stressed that the principle of proportional distribution of the net income does not exclude a possible deviation of prices from their general level for some given purpose arising out of the tasks of developing the national economy and of improving the well-being of the people.

The new uniform procurement prices are established as average prices, varying by zones according to soil, climate and economic conditions, and are on the whole below the social value of the collective farm produce.

The socially necessary expenditures of labor for the production of farm produce on collective farms are determined on the basis of relatively unfavorable conditions of production (natural fertility of the soil, climatic conditions and distance from marketplaces). The requirements of society for farm produce cannot be met by producing them only on the best soils, which are limited in quantity. Under socialism, when soil fertility is being constantly improved, means of communication developed and specialization improved, differences in the fertility of soils diminish but still continue to exist. Therefore, the necessity of cultivating soils of varying fertility and location remains.

Socialist society is interested in having all collective farms carry out expanded reproduction, in getting them to produce an ever-increasing quantity of products at lower costs, and lower expenditures of labor per 100 hectares of land. To achieve this, it is necessary that collective farms operating not only under relatively good or medium conditions, but also under the worst conditions, be able not only to cover expenditures but also to make a profit on the sale of their output.

Hence, under socialism the socially necessary expenditures of past and living labor for the production of farm produce are taken to be those which are expended in collective farms operating under relatively unfavorable conditions. These are the conditions in which, with a given demand and rational specialization, this or that product has to be produced. Therefore, the average procurement prices as stipulated in the decision of the June (1958) Plenum of the CC of the CPSU are higher for zones with relatively unfavorable farming conditions, approaching the social value of the agricultural produce, and lower for zones with relatively good production conditions, deviating further and further from this social value.

The differentiated zonal prices, therefore, assure equal conditions for deriving a net income for all collective farms.

In establishing prices for various collective farm products it is necessary to ensure the distribution of the value of the surplus product, realized by all collective farms in the country, in proportion to the average zonal planned production costs of each of these products. In order to achieve this aim favorable conditions were set up when establishing the new prices. This refers to the elimination of the shortcomings of the old state purchase prices. In the past the practice of establishing state purchase prices without any consideration for production costs resulted in some products, such as grain, potatoes and vegetables, yielding good profits while others, such as animal products, did not even cover the outlays of many collective farms for their production.

At present, prices for animal products have been raised compared with the old state purchase prices: for cattle (live weight) of average fatness by 51%, pigs (meat breed) by 12%, etc. The average price for potatoes, on the contrary, has dropped in comparison with the old state purchase price for most regions by 25%. The price for grain has also been reduced. With the abolition of the high premiums over procurement prices for technical crops new state purchase prices have been established, which enable collective farms cultivating these crops to obtain the necessary accumulations. The ratio between the new state purchase prices and production costs for major collective farm produce has changed in a way to ensure more or less equal rates of profit for all major agricultural products.

The new uniform procurement prices for collective farm products, taking into account the foregoing principles, ensure:

(1) Redistribution of part of the net income created in collective farm production to meet the needs of other, developing branches of the national economy, and in the first place, of heavy industry.

(2) An approximately identical level of profitability for all kinds of farm products.

(3) Promotion of increased output of agricultural products.

The adoption of the average planned zonal production costs as a basis for prices will stimulate collective farms to raise productivity of labor, reduce expenditure of means of production and the labor of collective farmers per unit of output. It should, however, be borne in mind that planned production costs as a basis for prices may only be applied if their planning is scientifically grounded.

Stimulation of higher-quality collective farm produce, which fully accords with the requirements of the economic laws of socialism, including the law of value, is of great national economic significance. Better-quality produce has a greater social value and is in greater demand than produce of inferior quality. Therefore, it is paid for at a higher price. In the Moscow region, for example, procurement prices for potatoes provide for extras of 12 rubles for first-grade and 6 rubles for second-grade seed potatoes Prices for well-fattened cattle exceed those for cattle of average fatness by 40-41%, whereas prices for cattle of below-average fatness are 20-21% less than prices for cattle of average fatness. The purchase price for inferior (non-standard) quality is 20% below that established for cattle of below-average fatness. The same also holds in the case of young animals from one to three years old. The price for heifers also depends on quality. The principle is the same in respect to sheep and pigs. Bacon pigs get the highest rates, then come lard and finally meat pigs. The price for inferior quality pigs is 20% below that of meat pigs. In the purchase of milk its acidity is considered. The prices for cream depend on the fat content. A sum of 35 kopeks is paid for each per cent of fat in one kilogram of cream. Prices for fruits are also differentiated on the basis of quality. A 20% higher price, as compared with prices for the first grade, is paid for high quality apples, pears and plums.

Early vegetables and potatoes are items of great importance for the population's national food consumption. But their cultivation requires relatively great amounts of labor and the demand for these products is also high. For this reason higher prices are paid for early vegetables and potatoes which collective farms deliver to the supply bases The criterion for the establishment of these prices is the retail price, which changes with the seasons. In the spring and summer retail prices for vegetables and potatoes reac the maximum level. Procurement prices are set below retail prices.

Delivery by collective farms of fresh and processed vegetables and melons directly to shops, food catering establishments and urban warehouses is greatly encouraged. The discount from the retail price in this case is less: from 7-10% to 15%, depending on the season. The discount lowest in the spring and early summer.

In characterizing the new procurement prices for collective farm output the principle of their stability and mobility which is also connected with the application of the law of value and the principle of material incentive, merits special attention. The procurement prices for collective farm produce, according to the decision of the June (1958) Plenum of the CC of the CPSU, are established on the basis of average zonal production conditions over a number of years. By duly considering these conditions it is possible to plan stable prices and thereby interest collective farms in reducing production costs. However, the conditions of production and the factors determining the productivity of labor in agriculture depend to a large extent on the weather Therefore, even in the case of equal expenditures of labor and means of production for the yield of a harvest, its size will fluctuate from year to year. It follows that production costs for a unit of farm produce are not the same every year. When conditions are favorable and bumper crops are reaped, production costs per unit of produce are low and payments for produce at stable prices yield collective farms unreasonably high incomes. In this event, from the point of view of the interests of the whole national economy the rational thing to do is to cut procurement prices, but this must not adversely affect the rate of development of collective farm production. This reduction must be such as will enable them to continue expanded reproduction at a high pace.

But given unfavorable conditions, the harvest may be low The expenditure of labor and means of production per unit of output in value terms may be higher in such years than he established price and collective farms will be unable to over them. It has therefore been decided in cases of this ind to raise procurement prices. Hence, the mobility of rices takes full account of fluctuations in the value of colective farm produce and conforms to the interests of the ollective farms and the whole of the national economy.

Price fixing for collective farm produce is carefully designed to take into account the requirements of the law of alue and other economic laws of socialism, and to make efective use of the principle of material incentive.

The establishment of economically-substantiated prices is n indispensable condition for the successful development of ollective farm production and the national economy as a hole.

The 21st Congress of the Communist Party of the Soviet Jnion has advanced a majestic program of all-out commuist construction in our country. In the next fifteen years ur country will set up the material and technical foundations f communism. This will make it possible to considerably increase production in all branches of the national economy, ncluding agriculture, which is called on to create an abundance of foodstuffs in order to fully meet the vital requirements of the people.

The seven-year plan for national economic development of he USSR (1959-1965), the target figures of which were aproved by the 21st Congress of the CPSU, is part and parcel f the long-range fifteen-year plan. By 1965 a considerable part of the great program of communist construction will be fulfilled.

Gross agricultural output in 1965 will rise by roughly 70% compared to 1958. Grain production will go up to 10 or 11 billion poods. Production of raw cotton in the seven-year period will increase by 30-40%, sugar beets by 40-55%, flax fiber by 31%, potatoes by 71%, vegetables to an amount which will fully meet the needs of the population, meat (in slaughter weight) by 100%, milk by 70-80%, wool by 70%, eggs by 60%.

Output of vital food products per 100 hectares of agricultural land will considerably exceed the present US level. The countryside will record unquestionable successes in solving the problem of overtaking and outstripping the USA in the production of field crops and animal products per capita of the population.

Increased collective farm and state farm production will make it possible to considerably increase state procurements of agricultural products to the amount necessary to satisfy the needs of the national economy, which is developing at extremely rapid rates.

The system of properly adjusted economic relations between the collective farms and the state, in which the problem of price formation for collective farm produce holds a leading place, is destined to play an important part in the solution of these tasks.

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I. Krasnov:

Power Systems and Their Role in the Development of Productive Forces

Further electrification of the Soviet national economy is set as one of the major tasks in the target figures for the economic development of the USSR in 1959-1965. The 21st Congress of the CPSU stressed that the forthcoming seven years will be the decisive stage in the realization of Lenin's idea of complete electrification of the country. In 1965 the USSR will generate 2.1 to 2.2 times more electric power than in 1958. This will be achieved through the construction of huge thermal and hydroelectric power stations.

Within the seven years the electric power industry of the country will undergo vast changes not only quantitatively but also qualitatively. Large-scale construction of electric power stations will be accompanied by the establishment of power grids in the European part of the USSR and Central Siberia as well as unified power grids in the North-Western and Western areas, Trans-Caucasia, Kazakhstan and Central Asia. The linking of electric power stations and networks into great power grids will facilitate a more rapid and wider electrification of industry, transport, agriculture, and make for wider use of electricity in various domestic appliances.

The June Plenary Session of the CC CPSU outlined a program for speeding up technical progress in industry and construction. To realize the decisions of the Plenary Session it is essential to assure a further and rapid increase in the relative saturation of industry with power in view of the fact that the proposed integrated mechanization and automation program is organically associated with wider and deeper electrification both of mechanical and technological processes in industry. For this purpose it is essential to achieve a higher rate of the electrification of the country and to ensure stable and economical sources of electrical power supply. This, in turn, increases the significance of power supply systems from the viewpoint of state interests and the national economy.

The main task of the seven-year plan is to achieve a further powerful rise of all branches of the national economy on the basis of priority development of heavy industry, or in other words, to considerably increase the country's economic potential in order to ensure a continuous rise in the living standards of the people.

To solve this task it is necessary to switch technology and organization of production to a new, higher level. A major prerequisite for the successful fulfillment of the seven-year plan is technical progress in all branches of the national economy, wide introduction of integrated mechanization and automation, reconstruction, enlargement and technical re-equipment of existing plants and modernization of obsolete equipment.

This calls for a further development of electric power engineering, since in our time technical progress and better organization of production in all branches of the national economy are inseparably bound with electrification. The rate of increase in electric power generation should run ahead of the rate of development of the national economy as a whole. Thus, while the seven-year plan provides for an average increase in industrial production of 8.6% a year, it is planned to increase electric power generation at an average rate of 11.2-12% a year. Such a lead in electric power generation is explained by the following main considerations.

The seven-year plan envisages a considerable rise of labor productivity in all branches of the socialist economy. In our days a rise in labor productivity is assured mainly by increasing the relative saturation of industry with electric power. It has been practically demonstrated that for a 50% increase in labor productivity it is necessary to increase by 75% to 80% the amount of electrical power available per worker.

An indispensable condition for technical progress is the acceleration of technological processes, greater speed of processing of materials, higher temperatures and pressure the use of special metals and alloys. All this calls for an increase in the output of special steels, ferro-alloys, alum num, titanium, magnesium, and consequently for an extensive development of power-consuming industries, for more intensive electrification of mechanical and thermal process in industry. Therefore industrial electric power consumption should increase faster than the industrial output.

Integrated mechanization and automation of industrial processes, wider use of various domestic appliances, electrification of the main agricultural processes, the vast program of electrification of railways — all this calls for a rapid increase in electric power generation, for large-scal construction of electric power stations and electric networks.

Electric power generation in our country is increasing a an exceptionally rapid rate. By 1950 the Soviet Union emerged as Europe's biggest and the world's second larges producer of electric power. By 1965 the USSR will generat 500-520 billion kwh. a year, against 233 billion in 1958. By 1972 this figure will reach approximately 900 billion kwh. Such an increase in electric power generation can be attained only through a transition to a basically new stage of electrification and by effecting this transition on the basis of new technological methods which ensure the require rate of development of the power industry. This is to be achieved mainly by giving priority to the construction of huge thermal power stations and installations and great hydroelectric power stations mostly in the Eastern areas the country — on the Angara, Yenisei, Ob and Irtysh Rivers, and also by linking up and creating power grids in the Eur pean part of the USSR and Central Siberia.

At the present time thermal stations are the main power producers in the USSR, accounting for upwards of 80% of a the electric power generated in the country. For the next ten to fifteen years this proportion will remain essentially unaltered, although in some areas hydroelectric power wil play the leading role. In the next few years most of the ne thermal power stations will be huge district stations of 600,000-1,200,000 or more kw., which will ensure a considerable reduction of capital investments per unit of rate ower capacity. Such stations will be equipped, as a rule, ith turbogenerators of 150,000 to 200,000 kw. each, opera- ng in a unit with a boiler. Along with increasing the pow- r of each individual turbogenerator the new units will op- rate at a more economical steam pressure of 130 atm. nd temperature of 565°C. There will also be turbogenera- ors of 300,000 kw. with steam parameters of 240 atm. and emperature of 580°C. By the end of the seven-year plan is planned to install the first units of 600,000 kw. each.

Both the capital outlays for the construction of such pow- r stations and their operating costs are considerably re- uced. For instance, for a thermal power station of 400,000 600,000 kw. with units of 100,000 kw. and steam param- ters of 90 atm. and 500°C, the cost of each rated kilo- att is 1,300 to 1,500 rubles and per each thousand kw. it equires two to three operators. For a power station of ,200 to 2,400 thousand kw. with turbogenerators of 150,000 200,000 kw. each and steam parameters of 130 atm. and 65°C, or for turbogenerators of 300,000 to 600,000 kw. ith steam parameters of 240 atm. and temperature of 80°C we may expect the construction costs for each rated w. to go down to 900-600 rubles and the personnel factor ill be 1 to 0.6 per one thousand kw. of its rated capacity.

The transition to larger power units will also be highly conomical from the viewpoint of operating costs. Experi- nce has shown that transition from lower steam parame- ers to higher ones reduces power stations' operating costs 0% to 12%. Moreover, with transition to super-high steam arameters of up to 130 atm. and 565°C, operating costs of 50,000-200,000 kw. units are 12% to 14% lower than in the ase of electric power stations operating at steam parame- ers of 90 atm. and 500°C.

Another major task is to raise the technical level of hy- roelectric power stations and to reduce considerably the elative capital investments in the construction of hydro- lectric stations.

The main line of development of the Soviet electric power dustry will be to build huge district thermal and hydro- lectric power stations, electric networks, to link up elec- ric power stations into power systems and then to connect ese systems into great power grids. At the present time ach of the power systems of the Center (Moscow, Yaro- lavl, Ivanovo, and Gorky), the Urals (Perm, Sverdlovsk, helyabinsk) and South (Dnieper, Donbas, Rostov) ossesses a capacity of several million kw.

The great increase in the generation of electric power nder the seven-year plan and after, the construction of uge thermal and hydroelectric power stations necessitate sharp increase in the construction of high-tension trans- ission lines, the establishment of links between individual ower systems and the transmission of greater amounts of ower over longer distances.

Our country leads the world in long-distance transmis- ion of electric power of high tension. Already in the early 0's we used for this purpose power of 220 thousand volts. hen followed an intensive theoretical experimental and de- igning work for a transition to a higher tension of 380 to 00 thousand volts. As a result there was built the first 00-thousand-volt 850-kilometer Moscow-Kuibyshev line transmit the power generated by the V. I. Lenin Volga ydroelectric Power Station to the Moscow Grid.

This year there was commissioned a 400-thousand-volt line etween the V. I. Lenin Volga Hydroelectric Power Station nd Sverdlovsk via Bugulma and Zlatoust. At the present me we are considering the question of switching these lines to tension of 500 thousand volts. Another line to transmit electric ower of similar tension is under construction between the alingrad Hydroelectric Power Station and Moscow.

The target figures for 1959-1965 provide for a vast program of construction of transmission lines. In all it is planned to build during this period about 200,000 kilometers of such lines, including 7,000 kilometers of 400 to 500 thousand lines, 3.7 thousand kilometers of 330 thousand volts, 32,000 kilometers of 220 thousand volts, 77,000 kilometers of 154-110 thousand volts and 80,000 kilometers of 35-thousand-volt lines.

In view of the extension of electrification to new areas it is imperative that the Ministry of Construction of Electric Power Stations and the corresponding economic councils should pay special attention to the realization of the program of construction of 110-and 35-thousand-volt transmission lines. In this they should widely use the opportunities of connecting new areas to existing sub-stations, including the railway traction sub-stations, the compressor sub-stations of oil and gas pipelines and also to inter-district and inter-collective farm electric power stations built partly with funds supplied by collective farms.

To transport large amounts of electric power over great distances it will be necessary to build new super-high tension transmission lines. In view of that we should expect a transition from 400-500-thousand-volt, 1,000-kilometer lines carrying about 1 million kw. to 600-thousand-volt A.C., 2-3-thousand-kilometer lines and 800-1,200-thousand-volt D.C. lines of the same length carrying several million kw.

The establishment of power systems and the pooling of several electric power stations operating in parallel offers most important economic and technical advantages.

(1) Reduction in the required electric power station capacity in view of the staggering of peak loads of individual groups of consumers (the so-called coincidence of load charts). This staggering is of special importance during peak loads from industrial and municipal consumers. A further reduction of the required electric power stations capacity is possible owing to a reduction of the required reserve capacity owing to a similar staggering of the demand.

(2) Greater possibilities for concentrating power generation by increasing the capacity of individual units of the main equipment and by increasing the capacity of individual electric power stations, accompanied by greater dependability of the power supply system as a result of the existence of a general reserve of the system, the increase in the number of sources of power supply, etc.

(3) The optimum use of electric power stations of different types possessing various properties and operating at varying degrees of efficiency. For instance, hydro-power stations (as those possessing the greater flexibility) could be used at peak loads. The thermal power stations could be used according to the general rate of heat consumption while the big condensation electric power stations could supply the basic part of the general load, etc.

(4) The most economical distribution of loads between stations operating in a system, which makes for a substantial economy of fuel, permits the best use of the capacities of electric power stations and consequently reduces power generation costs.

(5) An increase in the general flexibility and dependability of operation in view of greater possibility of maneuvering in equipment overhauls, interchangeability of electric power stations fired with different fuels, etc.

(6) Reduction of maintenance personnel through concentration of capacities, automation of equipment, relative reduction of fuel consumption, centralization of control of the power system which is actually converted into a single power station, etc.

Power systems are called upon to play an important role in the further rational distribution of industry, specifically in the development of the natural resources of the Eastern areas of the country. The development of the natural resources of Siberia, Kazakhstan, and the Far East calls for large amounts of electric power, for the construction of transmission lines to carry power to factories, new construction projects, mines, coal pits, etc.

One of the tasks involved in the construction of huge power systems and the establishment of a single power grid of the USSR consists in the further intensive economic development of the rich natural resources of our country, more rational distribution of productive forces over its territory, in moving industry closer to sources of raw materials, fuel and to consumers.

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Three principal stages should be distinguished in the linking up of the power systems in the next ten-fifteen years:

The establishment of the basic part of the power grid of the European part of the USSR which will link up the Urals, the Center and the Ukraine, as envisaged by the seven-year plan;

The establishment of the unified power systems of Central Siberia, the North-West and the Caucasus, which must be completed approximately before 1965;

The establishment of a single power grid of the USSR by linking up the Siberian system with the power grid of the European pasrt of the USSR and its connection with the power grids of the North-West and Caucasus approximately by 1970-1975.

The power grid of the European part of the USSR began to take shape with the construction of the huge hydroelectric power stations on the Volga and Kama Rivers. The combined capacity of the biggest hydroelectric power stations — the V. I. Lenin and Stalingrad Stations on the Volga and the Votkinsk Station — will be just under 6 million kw. Design estimates have shown that such great hydroelectric power stations can be utilized most fully and rationally when they operate within a power system whose capacity is at least five times greater than the aggregate capacity of the hydroelectric power stations. Thus, one of the tasks involved in creating the power system of the European part of the USSR is to ensure the most rational utilization of the hydroelectric power resources of the Volga and Kama watersheds.

Moreover, the construction of the power system substantially lowers the relative capital investment required for creating a power supply system for practically the entire territory of the European part of the USSR and ensures cheap electric power to nearly one-half of the entire national economy of the USSR and to two-thirds of the entire population of the USSR through the construction of great thermal power stations. This will provide the prerequisites for a further great increase in labor productivity.

In order to ensure a more effective use of the power and capacity of the Kuibyshev and Stalingrad Stations, to create a mutual reserve of the power grids, and also to take advantage of the staggering of peak loads, it has been found advisable to link up the power grids of the Center and the Volga Valley with those of the Urals and the South by building first a 400-500-thousand-volt Kuibyshev-Urals line, to be followed by a Stalingrad-Donbas line.

The 400-500-thousand-volt lines from the Lenin Station on the Volga and the Stalingrad Station to Moscow and the Urals run across vast territories, short in power but possessing great prospects for industrial development. By building intermediate sub-stations it will be possible to greatly widen the zone of operation of the existing power systems and include vast territories in the centralized system of power supply (the Ryazan Region, the Mordvinian ASSR, the cities of Tambov, Michurinsk, Voronezh, Lipetsk, Ulyanovsk, Votkinsk, Izhevsk and the adjoining areas, as well as the oil-bearing areas of the Tatar and Bashkir Autonomous Republics and others).

The creation of the power grid of the European part of t USSR will make for continued intensive industrial development of the areas served by it, which have large population density, raw material resources and a well developed tran portation system.

The power grid of the Urals industrial area is one of the biggest in the USSR. It links up the Perm, Sverdlovsk, Chelyabinsk, Bashkir and Orenburg power systems with ex tensions running to the Udmurt, Kurgan and Tatar Econom ic Areas as well as to the Lenin Station on the Volga. A further development of the Urals power industry is slated for 1959-1965.

By now extensive work has been done in determining the economic effects from linking up power systems on the ba sis of the example of the power grid of the European part of the USSR.

The creation of the power grid of the European part of the USSR makes it possible to utilize hydroelectric power stations in the most rational way. It has been estimated that the nominal capacity of the Kuibyshev, Stalingrad and Votkinsk Stations alone will be approximately 2.6 million kw. greater if they operate within power grids (at the level of 1962, corresponding to the time when the Kuibysh and Stalingrad Stations will attain full power) than it would have been if they operated in isolated systems. At the same time this will also make it possible to generate an additional 5 billion kwh. in years with an average water-flow.

Aggregate capital investments and operating costs involved in the creation of the first section of the power gri of the European part of the USSR together with the lines connecting the systems amount to 7.3 billion and 500 million rubles respectively. This includes:

About 4.2 billion rubles for the construction of a single high-tension network and about 240 million rubles of operating costs a year;

Some 2.1 billion rubles for installing additional units at hydroelectric power stations, with a corresponding increas of their nominal capacity in case they operate within a po er grid compared with their operation in isolated systems and 100 million rubles of operating costs a year;

About 1 billion rubles to increase capacity of thermal power stations and heat installations to compensate for th losses of capacity and power in inter-system transmissio lines, and about 100 million rubles of operating costs a ye

Furthermore, a power grid ensures a saving of some 4. million kw. in the capacity of condensation electric power plants in connected systems. The saving in capital invest ments and operating costs minus the fuel component thus achieved is estimated at 4.9 billion rubles and 430 millio rubles a year respectively.

About 2.9 million tons of conventional fuel will be save per year by increasing hydroelectric power generation by raising the efficiency of thermal condensation electric po er stations and also by cutting down the electric power co sumed by the stations for their own needs. The general s ing in capital investments and costs of fuel (mostly Donet coal) will amount to 0.9 billion rubles and 300 million rubles a year respectively.

Thus, the capital investments cited above (7.3 billion rubles) and operating costs (500 million rubles a year) in volved in creating the first section of the single power gr of the European part of the USSR are offset by the saving capital investments of 5.8 billion rubles and operating co of 730 million rubles a year. This means that the additio apital investments will pay for themselves in approximate-y six years.

Central Siberia possesses power resources unrivalled for heir scale and quality and large reserves of resources of aw materials for the development of key industries. Rapid conomic development of Central Siberia calls for a rational rganization of its power supply system to ensure the most xpedient distribution of its productive forces and a high evel of labor productivity.

The powerful industrial development of the Eastern areas f the USSR will be stimulated by the establishment of the Central Siberian power grid, whose backbone will be formed y the hydroelectric power stations under construction on the ngara and Yenisei Rivers and the new big thermal electric ower stations operating on cheap coals of the Kuznetsk, Kansk-Achinsk and Irkutsk coal fields. Consequently, the influence of the Central Siberian power grid is expected to ex-end from Novosibirsk and Barnaul in the West to Lake Baikal in the East, embracing the zones of operation of six xisting power systems — the Novosibirsk, Barnaul, Tomsk, Kuzbas, Krasnoyarsk and Irkutsk.

Siberia has an exceptionally favorable combination of ydro-power and fuel resources. The hydro-power resources f the Yenisei, Ob, Angara, Tom, Katun and other rivers re enormous. Most of these resources can be developed hrough the construction of great highly-efficient hydroelec-ric power stations generating extremely cheap electricity (from 0.5 to 1 kopek per kwh.), with a relatively low cap-tal investment. In the Kuznetsk, Kansk-Achinsk, Irkutsk nd other coal fields it is possible to organize large-scale trip mining of coal and consequently coal production costs ere will be many times lower than in the European part of he USSR.

The combination of great power resources and rich re-erves of raw materials marks out Central Siberia as an rea for priority development of industries requiring large mounts of power, based on electrolytical and electrother-nal processes, such as the production of aluminum, mag-esium, ferro-alloys, certain chemical products, etc.

The rate of increase of electric power consumption in reas encompassed by the power grid of Central Siberia will reatly surpass the mean rate of increase of electric power onsumption in the USSR as a whole. At the present time the rkutsk (660,000 kw.) and the Novosibirsk (400,000 kw.) hydro-lectric power stations are operating at full power. Under onstruction is the Bratsk Hydroelectric Power Station 3,600,000 kw.), the first turbogenerators of which are cheduled to be launched at the end of 1961, and the Krasno-arsk Hydroelectric Power Station (4,000,000 kw.). Cur-ently the question is being considered of increasing the apacity of the Bratsk Hydroelectric Station to 4,500,000 w. and of the Krasnoyarsk Hydroelectric Power Station up o 5,000,000 kw.

The possibilities of harnessing the waters of the Angara nd Yenisei Rivers for power generation are by no means xhausted by that. Plans are afoot for the construction of a umber of other hydroelectric power stations (the Ust-Ilim, eniseisk and others), to begin after the completion f the seven-year plan.

Most of the thermal condensation electric power plants lready arising or planned are large district power sta-ions of 1.2-2 million kw. each or larger with turbogenera-ors of 150, 200, 300, and 400-600 thousand kw. During the eriod ending in 1965 the majority of the new condensation nits will be turbogenerators of 200,000 and partly of 00,000 kw.

Of the electric power stations of the type mentioned above, t the present time those under construction are the Tom-Usinsk District Power Station, the first two turbogenerators of which already went into operation, and the Belovo District Power Station in the Kuznetsk System. Within the Krasnoyarsk system the Nazarovskaia District Power Station is now being built.

As a result of the great capacity of the district power stations and the low cost of fuel, power generated at condensation electric power stations of the Central Siberian system will cost an average of 2 kopeks per kwh.

It is planned to link up the main electric power stations of the power system by means of 500-thousand-volt transmission lines. The backbone of the Central Siberian power grid will be the 2,000-kilometer, 500-thousand-volt Kuzbass-Krasnoyarsk-Bratsk-Irkutsk line.

An abundance of power and fuel resources in the area under consideration ensures the saturation of industry with power unequalled anywhere in the country. This has a major bearing on the solution of the problem of industrialization of enormous Siberian territories, the law population density of which represents one of the main obstacles to the development of its productive forces.

For the North-West it is planned to create a control power grid which is to encompass the Leningrad Power System, Estonia, Latvia, Lithuania, Byelorussia, and the Kaliningrad Region and later on link up with the Karelian ASSR and the Murmansk Region. The decisive consideration for such a link-up is the most efficient utilization of the capacities of great thermal electric power stations operating with combustible shales of the Estonian SSR and the Leningrad Region, the peat-fired power stations of Byelorussia and the hydroelectric power stations on the Western Dvina and Niemen Rivers, in the Leningrad Region, the Karelian ASSR and Murmansk Region.

In the Caucasus it is planned to link up the power systems of the Armenian SSR, the Azerbaidzhan SSR and the Georgian SSR. The high-tension transmission line from the Mingechaur Hydroelectric Power Station (in Azerbaidzhan) to Tbilisi represents the first step towards the establishing of this power system and for the mutual seasonal regulation of the power systems of the Trans-Caucasian republics.

The culminating phase in the electrification of the country, ensuring maximum flexibility and the most economical electrical power supply of the national economy, will be the linking up of all power systems into a single power grid of the USSR. The single power grid will act as the most important organizing factor in the national economy, helping to increase further labor productivity, accelerating the development of natural resources, the construction of industrial enterprises, roads and cities. The single power grid will make it possible to use effectively the national economic reserves both in normal conditions and in the case of breakdowns at electric power stations, and will greatly increase the dependability of the power supply of consumers connected with it. The concentration of electric power station capacities and the most efficient use of power resources, in turn, will ensure a most rapid addition of new electric power-generating capacities and the centralization of electric power supply.

In the sphere of power generation the economic effects achieved on a national scale as a result of concentration of production are quite substantial. This is due to the great importance of fixed capital in the general balance of power industry production costs and the considerable effect of the capacity of power generating installations upon their technical performance. The growth of power-generating efficiency with increasing capacity of the units is especially marked and this fact is of great economic importance, since the fuel component plays a decisive part in the production costs of power generation.

Concentration of power production represents the main trend in the development of the Soviet power industry, since it ensures rapid addition of new generating units, concentration of capital investments at fewer projects, reduces construction and operating costs of electric power stations, improves the technical and economic characteristics of electric power stations, raises labor productivity in construction and operation, and, finally, helps to increase production at power machinery building plants and to increase the capacity of each individual power-generating unit.

In capitalist countries (the USA, Britain, France, FGR) the linking up of power systems went on especially intensively in postwar years. At the present time all West European countries are connected by electric power transmission lines. The capacity of these lines is not great compared with the capacity of the power grids they link up. Nevertheless, even such incomplete integration of power systems was highly useful in the hard winter of 1955-1956 when there was a sharp drop in the output of hydro-power stations in a number of countries.

It should be further noted that the territories of individual capitalist countries are incomparably smaller than the territory of our country. The territory of the United States is approximately one-third of ours and those of Britain, France, and the FGR are ten to twenty times smaller than the territory of the USSR. Nevertheless, the USA is making comparatively slow progress in integrating its power systems. It has no integrated high-tension grid. In contrast to the capitalist world, in the USSR socialist ownership of tools and means of production opens the broadest opportunities for linking up all power systems into an integrated power grid and solving, on this basis, problems of transmitting power over any distances.

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The linking up of small electric power stations existing in the country is of considerable importance. Here are some examples showing the economic effects of the linking up of some rural hydroelectric power stations for integrated operation.

The Orel power system of Stavropol Territory includes two hydroelectric power stations — the Orel station of 2,200 kw. and the Nezlobinskaya station of 500 kw. Prior to the link-up the Orel station worked below capacity, while the Nezlobinskaya was overloaded. Since the hook-up two machine-and-tractor stations, a motor-repair plant and a state farm have been connected to the net and the collective farms have considerably increased their power consumption. The table shown below presents some comparative figures showing the economic characteristics of isolated and integrated operation of these stations.

Indices	1955 (isolated operation)	First half of 1956 (integrated operation)
Electric power generation (thousand kwh.)	4,255	3,150
Coefficient of utilization of rated capacity	0.18	0.27
Electric power production costs (kopeks per kwh.)	41	23
Personnel	91	85

At a local power system consisting of the Storozhevskaia (800 kw.) and the Zelenchuk (450 kw.) stations which has been set up in the Stavropol Territory in 1955, the following results have been achieved by means of redistribution of the load and staff reduction:

Indices	1955 (isolated operation)	First half of 1956 (integrated operation)
Electric power generation (thousand kwh.)	3,380	4,000
Coefficient of utilization of rated capacity	0.31	0.37
Electric power production costs (kopeks per kwh.)	32	20
Personnel:		
administrative	10	5
operative	42	34

In considering the question of construction of small elec tric power stations and the unsatisfactory technical and economic characteristics of isolated operation of power stations, one cannot, of course, fail to take into account th size of our country and the remoteness of many areas fro centers of power supply. In view of the vastness of the territory of our country and the character of distribution o the national economy, small-scale power stations are indispensable in some areas and it is essential to take this fact into account in the general power balance of the country, especially for the immediate future.

Here are some of the main lines which may be recommended in the development of small-scale power stations:

(1) A reasonable restriction of construction of small electric power stations, along with greater capital outlays for the construction of electric networks and integrated devel opment of small-scale power stations which should be coordinated with the master plans for the electrification of individual areas of the country, so as to use to the utmost the advantages of centralized power supply.

(2) Improvement of the designs of small stationary elec tric power stations and of their equipment, which will mak it possible to build electric power stations on an integrate basis and reduce to the maximum the volume of construction and assembly work.

(3) Priority use of liquid and gaseous fuel.

The establishment of integrated power systems in the conditions of the reorganization of management in industr and construction will make it possible to sharply reduce the number of small and inefficient electric power station and to supply industrial enterprises, cities, collective and state farms with power from power grids.

The high rate of development of electrification in our country, the construction of great electric power stations and long distance super high-tension transmission lines, the creation of great power grids, present the boiler and turbine manufacturing, electrical engineering and instrument-building industries with most exacting demands with regard to supplying power stations and installations with reliable, efficient equipment and instruments.

The boiler and turbine manufacturing industry is confronted with the task of continuing to produce 150-200,000-kw. turbogenerators designed to operate in a unit with oilers with steam parameters of 130 atm. and 565°C and termediate steam superheating, also to start production f 300-600,000-kw. turbogenerators with steam parameters f 240 atm. and 580°C. For thermal power stations the inustry must manufacture turbogenerators of 50-and 100,000 w. bleeder turbines operating at initial steam parameters f 130 atm. and 565°C. To take care of peak heating loads, is necessary to start manufacturing special heating boilrs. Along with increasing the dependability and efficiency f the main equipment such as boilers and turbines, serious ttention must be paid to increasing dependability and effiiency of auxiliary equipment — feed pumps, exhausters, lowers, crushers, pre-heaters, etc.

For small power stations it is necessary to start prouction of 2,500-4,000-6,000-kw. condensation turbines perating on fresh steam at a pressure of 35 atm. and 35°C equipped with bleeders to supply heating and to procss steam, and counter-pressure turbines of 1,500 to 6,000 w. operating on fresh steam of the same parameters.

To further improve the hydroturbine equipment it is esential to start production of variable-pitch axial turbines to operate at a head of water of 50 to 80 meters, diagonal variable-pitch turbines for a head of water of 60 to 150 meters, radial-axial hydroturbines for a head of water of 400 to 500 meters, abrasion-resistant turbines, etc.

The planned creation of great power grids calls for the solution of a number of complex and important problems of automation and remote control (automatic frequency control, economical distribution of power by means of computing and modeiling equipment). At all new electric power stations equipped with unitized boilers and turbines, all thermal processes must be automated and control of all units must be centralized. The June Plenary Session of the CC CPSU laid special stress on the automation of electric power stations and systems. The implementation of the decision of the Plenary Session on the most extensive application of up-to-date automated equipment, of automatic and remote control systems in the electric power industry will make it possible to accelerate the realization of the decisions of the 21st Party Congress concerning the further development of the national economy under the seven-year plan.

A. Yefimov:

New Standards for Amortization of Fixed Capital*

Problems of amortization of fixed capital occupy an important place in studies of expanded socialist reproduction. The methodological foundations for the solution of the problems of transferring the value of fixed capital to the manufactured product, the determination of the essence of the problem of reproduction of fixed capital is one of the fundamental problems of the theory of reproduction, a scientific solution of which has made it possible to demonstrate the lack of foundation of the vulgar concepts of bourgeois political economy on the spontaneous growth of capital. The system of amortization of fixed capital is of major practical significance in the organization of a planned economy and in the realization of cost accounting. The magnitude of the standards of deductions for purposes of amortization is reflected, in a number of branches of industry, in a serious way, upon the cost of production, upon the terms under which equipment is renewed, and thus upon the rate of technological progress.

The economic role of amortization in the process of expanded reproduction rises continually with increase in the fixed capital of the national economy. During the years from 1913 to 1956, fixed capital in industry and agriculture rose 33-fold. In connection with the rapid increase in fixed capital, there was a substantial rise in the total deductions for purposes of amortization. Thus, the total amortization deductions in the entire national economy, which averaged eight billion rubles per year during the pre-war five-year plans, increased 63.4 billion rubles in 1957, and will be 81 billion rubles according to the plan for 1959. The future prospects for increase in fixed capital may be deduced from the fact that from 1959 to 1965 the total of capital investments in the form of government appropriations alone will attain nearly 2 trillion rubles.

Amortization deductions are an important source of the financing of capital construction. One-sixth of all government capital investments are covered out of the amortization fund. In the upcoming seven-year plan, in connection with the revaluation of fixed capital and the development of new standards for amortization deductions, the share of amortization in sources of financing will increase even further.

The great bulk of basic overhauls performed in the economy come out of deductions for amortization. In 1959, amortization deductions for major overhaul will total about 47 billion rubles.

We know that amortization is a component factor in the cost of productions and services. It reflects the consumption of means of labor in the costs of production. The share of amortization deductions depends upon the specific conditions of production. In extractive industries with high levels of mechanization it is, as a rule, higher than in manufacturing industry. Thus, the share of amortization in the costs of production in 1957 was 45.2% in the petroleum industry, 19.4% in electric power plants and power systems, 11.6% the peat industry, 6.3% in non-ferrous metallurgy, 5.5% in the iron and steel industry, 3.9% in the machinery industr 3.6% in the chemical industry, 1.2% in the foodstuffs indus try, and 0.8% in light industry.

In a planned socialist economy, rates of amortization o fixed capital are stable and undergo re-examination only connection with significant changes in the composition of the fixed capital and the conditions of reproduction thereo Thus, the standards of amortization now enforced for various types of fixed capital were introduced in 1930 and continue in effect, with minor changes, to this day. In the average rates of amortization for entire branches of indu try established in 1938, a standard of amortization deduc tions for major overhauls was established for this first time. However, the average amortization standards for branches of industry were not differentiated in terms of types of fixed capital, and this made it necessary to dedu additional calculated coefficients at the enterprises. With the assistance of these coefficients, the total amortizatio for the enterprise as a whole was distributed among the various types of fixed capital and segments of production with the purpose of including them in the cost of producti The coefficients for calculation make it possible to corre the sum of amortization calculated on the 1930 standards from the viewpoint of the level of average amortization standards for each branch of industry. Subsequently, som corrections were introduced only into the average standa of amortization, essentially in connection with the need t provide for major overhaul. The average standard of am tization in industry was 5.05% of the cost of the fixed cap in 1957 (of which 2.73% represented major overhaul), and 6.21% in transportation and communication (of which 4.7 represented major overhaul). Proceeding from these amortization standards, the average life of fixed capital industry is now set at about 43 years, and in transport a communications, at 70 years.

Today, these amortization standards have been outdate and do not correspond to the existing technological level production. They do not provide, on an adequate scale, f the funds needed to modernize and replace equipment in junction with the present-day problems of technological progress. In a number of branches, they do not even provide for replacement of physical wearing out of fixed cap This is testified to, for example, by the fact that in 1957, the country's economy was 10 billion rubles short on amortization requirements, of which industry accounted 5.9 billion.

The major reasons for losses in various branches of i dustry are the low evaluation of old fixed capital, the unsatisfactory maintenance of machinery and equipment, th high costs of major repairs, and, in a number of branche of industry, the low standards of amortization.

The existing rates of amortization do not reflect the elevated intensity of utilization of fixed capital during th five-year plans, and in particular the increased intensity f employment of equipment, which caused it to wear out nore rapidly. Standards of amortization also fail to conider the special features of particular types of equipment nd its employment. For example, the same amortization tandard has been set for drilling equipment as for other ypes — 9.2%. However, experience in the utilization of rilling equipment and final reports show that the rate of mortization is little more than one-third of what it should e and does not make good the costs of and expenditures pon major repairs to drilling equipment.

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* Editor's note: With this article the editors are closing the discussion on problems of calculating standards for the amoritzation of fixed capital.

A significant shortcoming in the present amortization ractice is the spread between the standards of amortizaion for specific types of fixed capital and the average tandards established for individual enterprises. The most ignificant shortcoming in the existing standards of mortization deductions consists of the fact that they do not rovide for obsolescence of fixed capital. Differences in valuation of identical types of fixed capital also interfere vith proper standards of deduction. As the result of changes n prices and tariffs, the value of fixed capital (buildings, tructures, machines and equipment, transport media, etc.) ept on the books in the prices of the year in which it went nto operation or was acquired vary very greatly and fails ncreasingly to correspond to replacement cost. This iscrepancy is particularly great in fields in which old ixed capital represents a large percentage of the whole.

In order to eliminate these shortcomings, the Soviet government has deemed it necessary to establish new differntiated amortization standards for various types of fixed apital with consideration for the changes in the technologial level of production in various branches of the economy. n this connection, it was decided to carry out a re-estimaon of the fixed capital, which makes it possible to introuce precision into the volume and structure of the fixed apital, to arrive at a correct determination of real wear, nore accurately to consider amortization in the cost of prouction, etc. In connection with the resolutions of the SSR Council of Ministers a re-evaluation will be conducted s of the status of January 1, 1960. The USSR Council of inisters has also instructed the USSR State Planning Comnittee in conjunction with the USSR Gosstroy, the USSR inance Ministry and the Central Statistical Administration f the USSR to develop, with the invited advice of the inerested Ministries, bureaus, economic councils, and the ppropriate research institutions, methodological instrucons for determining new amortization deduction standards nd for classifying fixed capital for purposes of amortizaon deductions, and to submit a draft of these new standards. eadership of the work to compile methodological instrucons and to classify fixed capital has been assigned to the conomic Research Institute of the USSR State Planning ommittee.

The preparation of new standards of amortization deducons has given rise to the liveliest interest on the part of cientific public opinion. This is testified to, in part, by he discussion on problems of amortization of fixed capital s developed in the pages of our economic journals. In the ourse of the discussion, various authors have advanced no mall number of valuable suggestions, which have been tilized in developing methodological instructions with repect to calculating new standards of amortization deducons.

A broad discussion has also occurred around such fundanental problems of amortization as the essence of amortizaon and its role in the process of reproduction of fixed apital, methods of calculating obsolescence in amortization tandards, the principles of grouping and the degree of ifferentiation of fixed capital, the service life of the tools of labor, methods of determining the volume of expenditures and standards of amortization for capital expenditures and modernization, the definition of an inventory unit for amortization deduction, etc. Currently, the State Planning Committee of the USSR, in agreement with the USSR Gosstroy, the USSR Finance Ministry and the Central Statistical Administration of the USSR have confirmed methodological instructions and a classification of fixed capital. They represent the result of a major collective effort in which over 80 organizations participated, in addition to important experts in this branch of economics.

An active role in the elaboration of a number of problems has been played by the USSR Railway Ministry, the USSR Merchant Marine Ministry, the USSR Communications Ministry, the USSR Geology and Resource Conservation Ministry and their research institutions, the State Committee of the USSR Council of Ministers on Chemistry, the Central Iron and Steel Industry Research Institute, the Experimental Research Institute for Metal-cutting Machine Tools (ENIMS), the All-Union Coal Research Institute (now the Mining Institute of the USSR Academy of Sciences), the former Central Scientific Institute for Technical Information and Economics of the Petroleum Industry, the Research Institute for Foundry Machinery and Foundry Technology (NIILITMASh), the Construction Economics Research Institute, the K. D. Pamfilov Academy of Urban Services, etc.

Below, we adduce the primary methodological principles to be employed in calculating the new amortization standards.

One of the fundamental questions determining the methodological approaches to elaboration of the new amortization standards is the question of the role of amortization in the process of expanded socialist reproduction.

Amortization serves primarily to reproduce the use of value of worn-out tools of labor in kind. However, as a result of the specific features of the turnover of fixed capital, amortization becomes not merely a source of simple, but also a source of expanded reproduction of fixed capital. "With respect to a situation," wrote Marx, "in which production displays a continuous increase in the process of partial replacements, we note the following. Although, as we have seen, fixed capital continues to function in natura in the process of production, a portion of its value determined by the mean rate of wear goes into circulation along with the product, is converted into money, constitutes an element in the reserve monetary fund serving to replace the capital when the time comes for its reproduction in natura. This portion of the value of fixed capital, converted as shown into money, may serve to expand the business or to introduce improvements in machines that will increase their efficiency."(1)

Technical progress results in an expanded scale of reproduction not only because of quantitative factors, but also due to the improvement of the very means of labor and reduction of its value. In this connection, this fund accumulated for amortization becomes expended upon more efficient tools of labor.

The methodological instructions proceed from the fact that the amortization of fixed capital is a gradual transfer of the value of these funds to products or services for the purpose of replacing the value of the capital and for accumulating monetary means for subsequent complete and partial replacement of fixed capital. The scale of deductions for amortization accumulated at the moment when fixed capital goes out of operation should be adequate to replace it in toto. However, the amortization fund is called upon to make possible basic overhaul during the entire period that the fixed capital is in service, and also to be a source for the rejuvenation (modernization) of obsolescent equipment and means of transport. In this connection, the standards of amortization deductions are established on the basis of economically desirable terms of service of fixed capital, with consideration for the funds required for capital expenditure and modernization.

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(1) Karl Marx, Capital, Vol. 2, 1954, page 168 (Russian edition).

In accordance with the purpose to which it is to be put, fixed capital is categorized as: a) fixed industrial capital, or the totality of tools of production and of labor comprising the foundation in material technology of socialist production; and b) non-productive fixed capital, or objects to be used over an extended period outside the sphere of production.

Fixed production capital constitutes the manufacturing apparatus of socialist society. In the process of consumption, it is only production capital that transfers its value to the newly-created product in the form of amortization. Non-productive fixed capital does not participate in the creation of material values. However, the consumption of fixed non-productive capital occurs over a long period of time, with the consequence that its value must also be replaced a little at a time as wear proceeds, or in other words, in the form of amortization. Thus, both fixed production and fixed non-production capital require amortization.

As distinct from the standards of amortization operative when identical fixed capitals in different branches of the national economy are amortized on different standards, the methods instructions will recommend the establishment of unified standards of amortization for fixed capital of the same type regardless of its departmental or administrative ownership. Natural conditions, the effects of aggressive media, and specific features of various types of production, influencing the period and nature of complete or partial reproduction of fixed capitals of identical type, are allowed for by establishment of the appropriate corrective coefficients. Coefficients are employed to allow for the degree of utilization of equipment and transport means, work procedures, the number of shifts worked, the load upon the equipment and transport devices and other conditions resulting in an elevated or reduced wear upon the means of labor. Unified amortization standards for fixed capital of identical type will make for uniformity in methods of forming the fund for replacement in various branches of the national economy.

Amortization standards will be established on a differentiated basis with respect to specific types of fixed capital and in accordance with the approved classification. The new classification envisages a broader differentiation of fixed capital than that now in effect under the classification by the All-Union Council of National Economy of the USSR, issued in 1930. The classification reflects the new types of machines, machine tools, apparatus, transport media and the like, developed in recent decades, and also makes allowance for specific conditions in various branches of industry.

Technical progress changes the structure of fixed capital not only in terms of purpose, but also in terms of length of service and methods of reproduction. In this connection, the new classification of fixed capital is based on two determining factors: a) the nature of the use to which the means of labor are to be put in production, with respect to production engineering, and b) the service life of these means of labor. A single group of fixed capital defined by purpose may include an enormous number of tools of labor (particularly in the field of equipment) with differing lengths of service life, and, on the contrary, tools of labor differing in character may have identical service lives. Howeve the number of groups cannot be limitless, and it is therefore necessary to attain an optimum coordination of the tw principles set forth above. This is primarily conditioned by purely practical factors: the effort to achieve a simpler and yet more universal classification applicable to elaboration of amortization standards on the basis thereof. The new classification of fixed capital contains ten divisions ar 474 groups. Depending upon purpose in the process of production, the fixed capital is divided into the following form 1) buildings, 2) structures and transfer devices, 3) power machinery and equipment, 4) working machines and equipment, 5) metering and regulating instruments and devices not directly installed in aggregates and machines, 6) transport media, 7) tools, 8) manufacturing and household inventory and appurtenances, 9) working cattle, 10) perennial plantings, and other fixed capital.

The establishment of a category of metering and regulating instruments and devices derives from the ever-increa ing importance of these in technological progress.

The new classification of fixed capital differs from the previous one in that the transfer device department is combined with that of structures. This is due to the fact that a the present time, transmissions have been almost complet driven out of industry by individual electric drives, and electric transmission lines and turbine drives approximat structures in their nature.

The grouping of fixed capital in the new classification d not make allowance for any special features in major overhaul. Nevertheless, it can serve as the basis for establishing standards for amortization deductions for purposes of major overhaul, as many tools of labor having identical service lives will often differ but slightly in terms of the nature of major overhaul. However, there is a large number of objects in the field of fixed capital which, although their service lives are identical, require major overhauls at different intervals. Therefore, in developing the new amortization standards, there may be required a further differentiation of individual groups of equipment so that each group will contain tools of labor having approximatel identical service lives and approximately identical standa of amortization for capital repair.

The major index to be considered in establishing standards of amortization for replacement is the actual (real) service life of specific means of labor, depending to a significant degree both upon technological and upon economic factors, and in particular, upon the time required for physical wearing out, and obsolescence, to occur. Physical wearing out determines the limits beyond which a given means of labor cannot function, due to features of its design, purpose, material construction, etc. Obsolescence defines the economically desirable service life in connection with the developments and large-scale introduction into production of more advanced and economical designs.

The existence of obsolescence of fixed capital under socialism is today generally recognized. Disagreements exist on the following questions: how to define the scale of obsolescence, whether or not to consider obsolescence in deductions for amortization, and if so, on what scale.

Some writers who recognize the existence of obsolescence of fixed capital under conditions of socialist production hold that the term "obsolescence" is valid only for a capitalist economy. Yet it is hardly sensible to introduce new terminology for an established concept.

Consideration of the first type of obsolescence in amortization standards resolves itself to a proper correction o prices for the functioning tools of labor in connection with he reduction in their replacement cost, as it is only the real cost of the means of labor at a given moment that is ncluded in the cost of the output manufactured. This correction is being made in the Soviet Union in the form of partial or complete revaluations of fixed capital conducted as the necessity arises, and on a large scale.

The second category of obsolescence requires the replacement of equipment before it has been physically worn out, by new and more advanced specimens of the same type, or else by modernization of the existing equipment. Therefore, the second type of obsolescence is provided for in the new amortization standards either in the form of a relative reduction in the period of amortization and a corresponding ncrease in the rates of amortization for replacement, if the equipment is being replaced, or by including in the amortization standard the necessary expenditures for modernization of outdated equipment, if it is not to be replaced. It is his approach to consideration of the second type of obsolescence that has now been adopted for elaborating new standards for amortization deduction.

In the course of the discussion, opinions were expressed relative to the undesirability of providing for obsolescence n amortization standards. Thus, some economists hold hat under the conditions of a socialist economy it makes no difference whatever as to whether or not we provide for obsolescence in amortization standards, as in any case the total of profits and amortization deductions of the enterprise will, all other conditions being equal, undergo no change. The reproduction of fixed capital itself occurs in accordance with government plans and, consequently, in their opinion, independent of the accumulation of amortization funds in this branch of industry. This posing of the question deletes the difference between very important economic categories, and in practice this may create the prerequisites for a voluntarist and wrong solution of economic problems. Thus, the lack of a clear delimitation of he boundary between the amortization fund and national ncome may result in an improper distribution thereof between the sums assigned for accumulation and those going o consumption. An improper calculation of amortization distorts the indices of cost and profitability as well as calculations of the efficiency of capital investment. Moreover, it must be borne in mind that the second type of obsolescence is an objective factor which brings about a relative reduction in the service life of fixed capital and hus compels an increase in amortization standards.

Some economists propose to allow for style 2 obsolescence by deducting into the amortization fund a specific share of the annual saving from the introduction of new equipment. However, this proposal is not applicable, as type 2 obsolescence is not compensated for by savings due o the introduction of new equipment but by increasing the amortization standards as the result of reduction of the service lives of the fixed capital.

The definition of the term amortization with allowance for obsolescence of fixed capital provides the greatest difficulty. There was no unity of opinion on this question and various points of view were expressed. Some authors related the period for economically desirable replacement of equipment only to the cost of the next major overhaul. However, the economic desirability of replacing equipment s determined not only by the cost of repair, but by the cost of the product produced on this equipment, and by the practical possibilities of acquiring new units to replace the obsolete, etc.

The conclusion with respect to the economically desirable term for amortization should be erected on the basis of a profound study of data on actual service lives of particular types of equipment in the past. These materials provided a concept of the periodicity of replacement in past years, and this may serve as a guide to the future. Moreover, it is necessary to analyze the age composition of the equipment on hand, as this may assist in judging the date when it may be expected to go out of operation. All these indices together fundamentally describe the term required for means of labor to wear out physically. Then it is necessary to proceed to study long-range plans for introducing and developing equipment during the planning period immediately ahead, which at the present time is 1959-1965. In this connection, data have to be acquired on the productivity of the new equipment that will be introduced into production during this period, relative to the efficiency and output capacity of the equipment now in use. All this will make it possible to determine the economic desirability of replacing obsolescent equipment prior to the date of its physical wearing out by new, more modern and more productive equipment, and also to determine the approximate dates of such replacement.

The replacement of outdated equipment by new, more modern equipment is economically desirable if this replacement makes it possible to increase labor productivity, to reduce cost of production, and to make good the additional capital investments (if such occur) by economies during the established term. As an example of the establishment of a term of years for replacing outdated equipment, one may use machines whose capacities have been fully mastered. Test machines or the first specimens of a type of equipment newly placed in use cannot serve as the point of departure for determining the service lives of means of labor in operation. However, obsolescent equipment cannot always be replaced in economically desirable terms. At the present time, the possibility of replacing obsolescent means of labor is determined from the equipment balance for 1959-1965.

Analysis of balances makes it possible to determine, for each of the years of the plant for 1959-1965, the following: 1) the output of a particular type of equipment, 2) the amount of imported equipment, 3) the amount of a given type of equipment to go to increasing fixed capital in conjunction with the construction of new and expansion of existing enterprises and finally, 4) the amount of this type of equipment going to replace the outdated. If comparison is made, under each category, for the quantity of obsolescent equipment and the quantity of equipment to be replaced each year, we are in a position to determine the term of years after which outdated equipment will be replaced by new. These terms will be the fundamental and determinant indices in establishing amortization rates.

Along with replacement of fixed capital, modernization of equipment will also have to proceed on a large scale. As distinct from major overhaul, which generally envisages restoration of fixed capital in its former shape, modernization represents a technological improvement of the equipment in accordance with modern production requirements, by changes in design, supplementation, replacement of certain parts and assemblies, installation of jigs and of monitoring and adjusting instruments, etc. The modernization of equipment improves the service life of fixed capital.

The cost of modernization is based on: a) analysis of materials on actual expenditures on modernization during the preceding period, with consideration of the organization of modernization operations during the upcoming seven years, b) standard projects for the modernization of equipment and c) direct calculations and expert estimates. The inclusion, in amortization standards, of expenditures upon modernization will create a permanent source for improving equipment in each enterprise, will free the initiative of the engineering and technological personnel, and will strengthen cost accounting on the job. However, all modernization expenses do not have to be financed from amortization funds. Work involving the reorganization of systems of machines, the introduction of assembly lines and conveyors, falls into the category of reconstruction of enterprises and is financed not from amortization funds but from other sources.

Sharp differences of opinion arose over the question of the amortization of secular structures. Some organizations and some economists proposed that amortization standards for them be set only to cover major overhaul. However, it must be borne in mind that the value of secular structures totals tens of billions of rubles, and failure to deduct amortization costs from eternal structures for purposes of replacement seriously distorts the real cost of products made with their aid. Moreover, as experience has demonstrated, many of these structures are to a greater or a lesser degree subject to obsolescence. The charging of amortization costs against secular structures was deemed to be desirable on the basis of a standard to assume the amortization period to be not more than 100 years.

Currently, outlays for major overhaul are made out of amortization deductions. A number of economists have expressed themselves as being in favor of including major overhaul expenditures on the cost of production, as is the accepted procedure for current repairs. This solution of the problem contradicts the economic nature of major overhaul. Aside from that, it makes possible uncontrolled concealment of overexpenditures for major overhaul in the cost of production. On the other hand, this makes it possible for an enterprise artificially to raise its rate of profit during any given year by disobeying the major overhaul schedule, and this threatens the life of the equipment. The methodological instructions retain the existing procedure for financing major overhaul out of amortization deductions.

New in the methods instructions is the recommendation that medium repairs taking place less frequently than every second year, and therefore economically similar to major overhaul, should be included in calculating the new amortization deductions for major overhaul. The existing practice of referring expenditures on medium repairs to current costs is not justified. A medium repair of, for example, a locomotive, a diesel engine, railway cars, etc., actually is a major overhaul, but merely smaller in scale. Thus, according to the data of the Central Research Institute of the Railway Ministry, a major overhaul of an FD locomotive costs 158,500 rubles and a medium repair costs 139,000 rubles. In terms of periodicity of repairs, a medium repair should be classified as a major overhaul. Moreover, the major overhaul of railway freight cars (aside from refrigerator cars and acid tank cars) is performed once every ten years, and a medium repair once every five years. The cost of a major overhaul of a unit of this type of equipment and the number of major overhauls during the entire amortization period is established on the basis of the proposition with respect to planned preventive repairs and, where no such rules exist, on the basis of direct calculations or expert estimates. Taking into consideration the shortcomings of the present practice in the deduction of amortizations on a system of general standards, the instructions as to method propose new standards for amortization deductions, to be set separately for: a) standards for amortization deductions for complete replacement of fixed capital and b) standards for amortization deductions for partial restoration (major overhaul) of fixed capital, and, where equipment and transport media are concerned, for modernization as well, inasmuch as major overhaul is frequently accompanied by modernization work. Separate calculation of the amortization standards makes for a correct determination of their scope and permits elimination of any possibility of unjustified understatement of amortiz tion rates for replacement due to the increase in the funds needed for major overhaul.

Establishment of separate amortization standards for replacement and major overhaul (including expenditures o modernization) corresponds to the problems of reinforcin the principles of cost accounting in the employment of fixe capital. However, this does not mean the existence of two separate standards of amortization deductions. They constitute two parts of a single amortization standard, and transfer of the sum of amortization deductions to cost of production or services is based on the total amortization standard.

Calculation of standards for deductions for amortizatior are more or less standardized and depend essentially upor the special features of the given group of fixed capital.

With many types of equipment, the amortization standar are calculated as percent of the cost of replacement of fix capital. Thus, the amortization standard for replacement calculated on the following formula:

$$S_r = \frac{R_{av} - L_{av}}{R_{av} \times A_p} \times 100\%; \qquad (1$$

while the standard of amortization of capital repair and modernization is calculated in accordance with the followi formula:

$$S_m = \frac{C_{av} + M_c}{R_{av} \times A_p} \times 100\%; \qquad (2$$

where S_r is the standard for amortization for complete re placement, R_{av} is the average replacement cost of a unit of equipment or transport equipment, A_p is the amortization period, S_m is the standard of amortization for capital repair and modernization, C_{av} is the average cost of maj overhaul during the entire amortization period, and M_c is the average cost of modernization during that period.

The liquidation value of equipment is the difference between two variables: a) the income from sale of the equipment (if it is delivered to another enterprise for further utilization) or the income from its sale as scrap if the equipment is being liquidated, and b) the cost of the disassembly work. In cases in which the cost of disassembly is greater than the income from sale, liquidation value is not taken into consideration in amortization standards.

There are some specific types of equipment and transp means for which amortization is established: a) in rubles per thousand km. of travel (for automotive vehicles), and in rubles per hour of flying time (for aircraft and aviation engines) and in rubles per unit of production.

In connection with the fundamental methodological prop sitions, ENIMS carried out tentative calculations to deter mine new standards for amortization deductions. 2000 enterprises in various branches of industry having appro mately 14,000 machine tools each were studied. It is clea from the documents for the writing off of machine tools in the 1955-1957 period that the average liquidation value of machine tool equipment is small and is only 1.3% of its initial value. Calculations by ENIMS show that the new standards of amortization for equipment will be somewha higher than those presently existing. Moreover, dependin upon the type of machine tool classified in various groups ne amortization standard will fluctuate within substantial mits: from 4.5% for the lathe, screw machine and other ools in this group, to 7.1% for honing and threading mahines. The standard for amortization deductions for major verhaul is about 2.2%, and that for modernization is about .4% of cost of replacement.

The question naturally arises as to how and in what direcon the new amortization deduction standards will affect ne scale of the total amortization fund for the economy as whole. Basing ourselves upon individual calculations it ould be difficult to determine the general changes not only the amortization fund, but even in the scale of individual tandards. This will be possible only after the ministries nd administrations, the departmental institutes and the appropriate economic councils present their projects for new mortization standards, and also after determination of the esults of the revaluation of fixed capital (during the first alf of 1960).

Calculations for combined groups make it possible to rrive at figures, but these should be employed only as ypical. It is possible that the average standards of amorzation for purposes of replacement in industry will inrease by more than 50% and will be 3.5% as against 2.32% the present time. The greatest increase in amortization tandards will take place in fields such as lumbering, coal, uilding materials, chemicals, and the food industry. The mallest increase is expected in fields such as the iron and teel industry, electric power plants, machinery manufacure, and non-ferrous metallurgy. An increase in the mortization standards will occur in those classes of equipnent where obsolescence is to be included.

As far as amortization rates for major overhaul are conerned, the probable increase in the value of fixed capital fter the revaluation, and the reduction in the volume of ajor overhaul resulting from consideration of obsolesence will probably result in a reduction in the amortizaon rates of equipment. However, inclusion in the amortition rate for major overhaul of the expenditures upon inor overhaul which is today being carried out in some ranches of industry against current expenditures on the ooks, will lead to some increase in amortization rates in ese fields. However, the cost of production will not inease in this connection, as all that will change is the bookeeping, which will shift the accounting of expenditures for inor overhaul. In some branches of the economy, specifilly in housing, the deductions for major overhaul will early rise.

Approval of the instructions as to method in determining e new rates of deductions for amortization and in classifyg fixed capital for purposes of calculating amortization epresents the beginning of a complex and major task.

A reappraisal of all the fixed capital in the economy will performed between September 1 and December 31, 1959. urrently, the ministries and bureaus, the departmental esearch and planning institutes, and certain economic ouncils are working out plans for new amortization standds for fixed capital. This work is to be completed by pril 1, 1960. The USSR State Planning Committee, the SSR Finance Ministry, and the Central Statistical Administation of the USSR will reexamine the plans for the new andards of amortization deduction and will compile standd amortization deduction quotas that will then be subitted to the USSR Cabinet for approval.

The revaluation of fixed capital and the development of w amortization deduction standards will facilitate replaceent of fixed capital, technological modernization, presertion of the tools of labor and further reinforcement of cost counting in the national economy.

Vneshnaia Torgovlia — Foreign Trade — 7, 1959

The Foreign Trade of the U.S.S.R. in 1958 — A Survey

In 1958 Soviet foreign trade made further progress within a framework of expanding output in all branches of the national economy. Industrial production increased 10% and national income 9%, over 1957. The Soviet Union's economic relations with both socialist and capitalist countries were also marked by substantial expansion. In 1958 Soviet foreign trade turnover was nearly 4% higher than in 1957 and 10.6% higher in comparable prices. Last year's physical volume of Soviet foreign trade was almost seven times greater than in 1938.

There was a further advance in economic cooperation with the socialist countries. Trade was carried out with most of them under long-term agreements on reciprocal deliveries based on coordinated national economic plans.

Soviet trade with the capitalist countries was carried out under conditions of the economic recession which in 1958 spread over a number of West European, Asian, African and Latin American countries. Due to shrinking capitalist markets, business circles in the capitalist countries displayed a brisker interest in expanding trade relations with the Soviet Union.

Consistently implementing a policy of peaceful coexistence of states with different social systems, the Soviet Union in 1958 signed a number of new economic and trade agreements with certain capitalist countries. At the beginning of 1959 the USSR had trade agreements with 35 capitalist countries, whereas in 1958 it had them with only 15 such countries.

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Soviet Trade Turnover
(in billion rubles)

	1958	1957	1958 (in per cent of 1957)
Turnover	34.6	33.3	103.9
including:			
socialist countries	25.5	24.5	104.0
capitalist ”	9.1	8.8	103.7
Export	17.2	17.5	98.1
including:			
socialist countries	12.5	13.2	94.9
capitalist ”	4.7	4.3	107.8
Import	17.4	15.8	110.4
including:			
socialist countries	13.0	11.3	114.7
capitalist ”	4.4	4.5	99.6

In 1958 the physical volume of exports was five per cent higher than in 1957, although in terms of value it declined somewhat; at the same time imports increased by ten per cent in terms of value and 19 per cent in physical volume. It should be noted that last year there was a considerable increase of reciprocal deliveries under clearing agreements with the socialist countries, with a decided increase in Soviet imports from these countries. Deliveries of Soviet commodities to the socialist countries on credit decreased, owing to the strengthening of their economies.

Last year the amount of Soviet exports to the capitalist countries was 7.8 per cent greater in terms of value than in 1957, and about 20 per cent greater in physical volume. Expansion of exports to those countries took place under conditions of declining prices and sharper competition on the world market.

In certain Western countries there were attempts to put up artificial barriers to Soviet exports. Late in 1957 the linen manufacturing industries in Western Europe adopted discriminatory measures against imports of linen fiber from the Soviet Union, and in 1958 a campaign of slander against Soviet exports of nonferrous metals (tin, aluminum) was launched in some capitalist countries.

In spite of the unfavorable situation Soviet exports to capitalist countries expanded substantially in 1958. Soviet foreign trade agencies strengthened business ties with capitalist firms and signed long-term sales and purchase agreements with many of them; there was also a large number of offers from capitalist firms for sales to the Soviet Union.

COMMODITY COMPOSITION OF EXPORTS AND IMPORTS

The successes scored in the development of all branches of the national economy enabled the Soviet Union in 1958 to increase its exports of many staple commodities. Exports of machinery, oil products, coal, and rolled iron and steel reached a new high. Although the domestic output of grain increased, exports decreased due to smaller deliveries to the people's democracies, which in 1958 were in a much better position than previously to meet their own requirements.

The share of machinery in total Soviet exports went up from 14.9 per cent in 1957 to 18.5 per cent in 1958; the corresponding figures for metal were 14.9 and 16.4 per cent, while the share of grain in total exports was down from 12.9 to 8.3 per cent.

Exports of machinery and equipment in 1958 were 23 per cent higher than in 1957, amounting to 3.2 billion rubles, of which 2.5 billion rubles' worth went to the socialist countries (an increase of 300 million rubles) and 700 million rubles' worth went to the capitalist countries (an increase of almost 300 million rubles). The increase in exports to socialist countries was mainly due to larger sales of motor vehicles and tractors, while the increase in exports to capitalist countries was mainly due to larger deliveries of complete enterprises and ships. At present Soviet machinery and equipment are being sold to 40 capitalist countries.

Deliveries of complete enterprises were the main item in the export of machinery and equipment (42.7 per cent). As in previous years, the principal buyer of Soviet industrial equipment was the People's Republic of China. A number of industrial projects were under construction with Soviet technical aid in Bulgaria, Poland, Rumania, Albania, Mongolia and Korea. Complete equipment for factories was also delivered to India, the United Arab Republic (UAR), Afghanistan and some other countries.

Exports of trucks rose from 11,200 units in 1957 to 29,700 in 1958; exports of passenger cars were down from 23,000 in 1957 to 21,700 in 1958.

According to data available on January 1, 1959, there w
270,000 Soviet motor vehicles in use in foreign countries.

In 1958 exports of coal went up to 9.9 million tons compared to 8.8 million in 1957; corresponding figures for cr
oil were 9.1 and 5.9 million tons; oil products—9 and 7.8 r
lion tons. Last year's exports of oil and oil products amounted to 16 per cent of the domestic output. Czechoslo
vakia, the German Democratic Republic (GDR), Hungary,
UAR and Italy were the main purchasers of oil, while China
Poland, the UAR, Sweden, Finland, the Federal Republic o
Germany (FGR) and France were the principal purchasers
of oil products.

Exports of Staple Ores and Metals
(thousand tons)

	1958	1957	1958 (i percen of 1957
Iron ore	11,919	10,773	110.6
Manganese ore	833	806	103.3
Pig iron	1,046	1,278	81.8
Rolled iron and steel	2,162	1,923	112.4
Copper	44	61	72.1
Zinc	66	72	91.7
Lead	62	55	112.7
Asbestos	118	103	114.6
Apatite concentrates	1,505	1,262	119.3

During the entire postwar period iron ore was being exported to the socialist countries only. In 1958 iron ore ex
ports to those countries increased by 988,000 tons, bringi
the total to 11.7 million tons. For the first time 159,000 t
of iron ore were sold last year to Austria.

Increase in the export of rolled iron and steel in 1958 w
due to larger deliveries to the socialist countries, while t
increase in the exports of tin and aluminum was due to larger purchases by capitalist countries.

Larger exports of timber and pulp-and-paper products were mainly due to larger sales of pulp. There was also a slight increase in the export of sawn timber (3.4 millio
cubic meters in 1957 and 3.6 million cubic meters in 195
As in 1957, the Soviet Union occupies third place in the world, next to the USA and Canada, in volume of grain exports. The socialist countries absorbed more than 70 per cent of Soviet grain exports.

In 1958 there was an increase in the export of Soviet watches, refrigerators, bicycles, television sets and othe
manufactured consumer goods.

Soviet imports in 1958 were the highest ever.

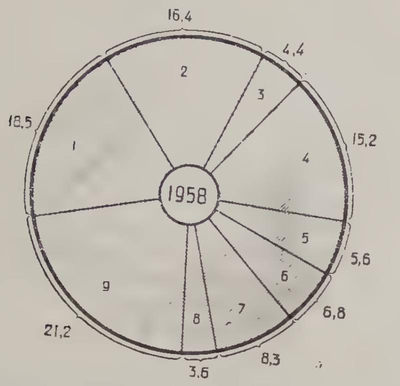
The share of machinery and equipment, manufactured consumer goods in total imports was higher in 1957, whil
the share of ores and ore concentrates, fuel, metals and textile raw materials shrank somewhat in terms of value

Imports of machinery and equipment in 1958 went up more than 13 per cent (due to purchases in the socialist countries) amounting to 4.3 billion rubles.

There was a substantial increase in imports of industr
equipment (from 1.9 billion rubles' worth in 1957 to 2.3 b
lion rubles' worth in 1958) the main items being equipme
for the chemical, building, metal-working and food industries.

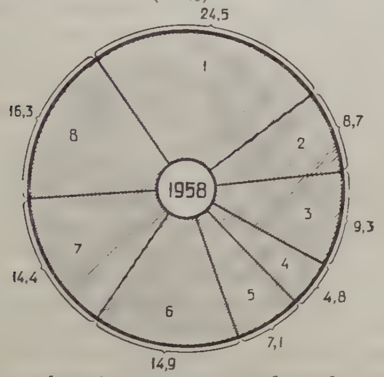
There was also an increase of imports in transport eq
ment, particularly rolling stock (electric locomotives, pa
senger and freight cars) and motor vehicles. Imports of ships remained at the 1957 level and imports of locomoti
were totally discontinued.

Commodity Composition of Soviet Exports in 1958
(in %)



1- machinery and equipment; 2 - metals and metal articles; 3 - ores and concentrates; 4 - fuel; 5 - timber and pulp-and-paper products; 6 - textile raw materials and semi-finished goods; 7 - grain; 8 - manufactured consumer goods; 9 - other commodities

Commodity Composition of Soviet Imports in 1958
(in %)



1 - machinery and equipment; 2 - metals and metal articles; 3 - ores and concentrates; 4 - fuel; 5 - textile raw materials and semi-finished goods; 6 - food products and raw materials for food production; 7 - manufactured consumer goods; 8 - other commodities

The share of fuel and raw materials in total Soviet imports was down as a result of declining prices on the world market. However, the physical volume of imports of many raw materials was on the increase.

Imports of Staple Fuels, Raw Materials and Rolled Products
(thousand tons)

	1958	1957	1958 (in per cent of 1957)
Coal	3,826	3,423	111.8
Crude oil	1,078	1,331	81.0
Oil products	3,218	2,937	109.6
Rolled iron and steel	784	723	108.4
Pipe	158	123	128.5
Zinc	31	32	96.9
Lead	30	28	107.1
Tin	19	22	86.4
Crude rubber	259	145	178.6

Rolled products were imported mainly from the capitalist countries, while pipe was purchased in the socialist countries.

In 1958 the Soviet Union was the world's second largest importer of crude rubber for domestic consumption, next to the USA.

The value of imports of raw materials for the light and food industries and of food and manufactured consumer goods reached a total of 7.2 billion rubles compared with 6.2 billion in 1957. There was a considerable increase in cotton imports (from 109,000 tons in 1957 to 142,000 tons in 1958), and leather footwear (11.8 million pairs in 1957, 24.5 million pairs in 1958). There was also an increase in the import of artificial fiber, tea, cotton and silk fabrics, ready-made clothing, knitwear, etc. Owing to a considerable increase in the domestic production of sugar, imports of that commodity were down from 645,000 tons in 1957 to 379,000 tons in 1958. A characteristic feature of Soviet foreign trade in 1958 was a shift in the share of manufactured products and raw materials.

Share of Manufactured Goods and Raw Materials in Soviet Foreign Trade
(per cent)

	Export		Import	
	1958	1957	1958	1957
Total	100.0	100.0	100.0	100.0
Manufactured products	60.4	57.2	63.8	59.5
Raw materials	39.6	42.8	36.2	40.5

The share of manufactured goods in exports and imports went up slightly on account of larger purchases and sales of machinery and equipment and manufactured goods; this shift was also due to the relative stabilization of world prices of manufactured products and a decline in raw-material prices.

TRADE WITH SOCIALIST COUNTRIES

The high rate of growth of production in the socialist countries, a further development of international socialist division of labor, and the growing economic, scientific and technical cooperation among these countries stimulated the expansion of Soviet trade with them.

The meeting of representatives of the Communist and Workers' Parties of the socialist countries held in Moscow in May 1958 outlined the prospects for the further development and improvement of methods of economic cooperation and of the utmost use of the advantages inherent to the world socialist economic system.

Last year Soviet trade turnover with the socialist countries was four per cent higher than in 1957, and eight per cent higher in physical volume. The socialist countries accounted for 74 per cent of the Soviet Union's trade turnover.

The increase of imports from the socialist countries was mainly due to larger purchases of machinery and equipment (20.4 per cent increase), food (60 per cent increase) and manufactured consumer goods (42 per cent increase). There was a substantial increase in Soviet exports of machinery to those countries (13.5 per cent), rolled iron and steel (22.6 per cent), iron ore (9.2 per cent) and oil and oil products (16.2 per cent). Deliveries of Soviet commodities played an important part in the further growth of output of basic products in the socialist countries.

In 1958, as in the preceding years, the Soviet Union's principal trading partners were the German Democratic Republic (GDR), the People's Republic of China and Czechoslovakia, with the GDR heading the list as in the past. In 1958 the USSR increased its deliveries to the GDR of iron and

Trade Turnover of the USSR with the Socialist Countries

(million rubles)

	1958	1957	1958 (in per cent of 1957)
Total	25,512	24,520	104.0
including:			
Albania	233	187	124.6
Bulgaria	1,614	1,482	108.9
Hungary	1,450	1,426	101.7
German Democratic Republic	6,463	6,506	99.3
Democratic Republic of Vietnam	72	52	138.5
People's Republic of China	6,061	5,129	118.2
Korean People's Democratic Republic	420	490	85.7
Mongolian People's Republic	448	471	95.1
Poland	2,568	2,747	93.5
Rumania	1,940	1,763	110.0
Czechoslovakia	3,835	3,747	102.3
Yugoslavia	408	520	78.5

steel rolled products, nonferrous metals and other raw materials, thus remaining that country's largest supplier of the raw materials needed by its industries. Exports of machinery and equipment too were on the upgrade, mainly on account of greater sales of motor vehicles and certain types of ships and marine equipment.

Imports of machinery and equipment from the German Democratic Republic (metal-cutting lathes, forge and press equipment, machinery for the food and chemical industries, rolling stock and ships) increased by 17.5 per cent over the 1957 total. The GDR's share in Soviet imports of machinery amounted to 44 per cent.

There was a considerable increase in Soviet-Chinese trade in 1958. China purchased Soviet machines and raw materials in larger volume. Thus, Soviet deliveries of metal-cutting lathes (excluding deliveries of complete enterprises) went up from 280 units in 1957 to 738 in 1958; drilling machines—from 129 to 296; tractors—from 68 to 2,656; trucks—from 284 to 20,595. In addition to the deliveries made under the protocol on trade turnover for 1958, the Soviet Union supplied China with a considerable amount of machinery and equipment, and this greatly helped the Chinese people in their effort to fulfill their second five-year plan. Exports of machinery and equipment to China were 17 per cent higher than in 1957, accounting for 40 per cent of the total Soviet exports of machinery and equipment. Deliveries of iron and steel rolled products, pipe, aluminum and certain other commodities also increased.

The successes scored by China in its economy, particularly in agriculture, enabled it to expand exports of meat and meat products, rice, fresh fruits and certain manufactured consumer goods to the Soviet Union. In 1958, 40 per cent of the USSR's total imports of food raw materials, almost 50 per cent of the food products, and 40 per cent of the manufactured consumer goods were purchased in China.

Soviet-Czechoslovak trade turnover in 1958 was slightl higher than in 1957. As in former years, deliveries of Soviet commodities facilitated the development of that country's national economy to a considerable extent. In 1958 Czechoslovak deliveries to the USSR of chemical industry equipment were 2.5 times higher than in the preceding year. There was also a substantial increase in the imports of Czechoslovak sugar-refinery equipment.

The trade turnover with Poland shrank, mainly due to a decrease in the sales of Soviet grain. At the same time there was an increase in the sales to Poland of oil products, iron and steel rolled products, and particularly of consumer goods (2.9 times increase). Imports from Pola remained on the 1957 level. Imports of coke, pipe and che icals increased, while imports of rolling stock, zinc and textiles decreased.

Soviet trade with Rumania and Bulgaria expanded in 195 Rumania purchased equipment for complete factories, as well as rolled iron and steel, iron ore, ferroalloys and other commodities in much greater volume. At the same time she sold to the USSR much larger quantities of oil products, pipe, cement and corn. Exports of machinery and equipment to Bulgaria too were on the upgrade. The Soviet Union has in the main completed its deliveries of equipment for the Damyanov copper smelting plant, the second blast furnace in the Lenin works, for the engineer works in Kolarovgrad, for an agglomeration plant and oth industrial projects. Deliveries of oil products, rolled iro and steel, and cotton also increased to a certain extent. Soviet imports from Bulgaria increased because of large purchases of electrical engineering equipment, ships, fresh fruit and vegetables.

Exports of Soviet commodities to Hungary somewhat decreased, owing to reduced deliveries on credit (particu larly of food products). On the other hand, there was a considerable increase in sales to Hungary of machinery and equipment (mainly passenger cars), oil, iron ore and certain other commodities.

Imports from Hungary increased last year by 50 per cent. The Soviet Union purchased much larger amounts of machinery and equipment, including new types of machines for the food industry, medical equipment, trucks and passenger cars, and manufactured consumer goods.

The trade turnover with Mongolia decreased slightly in 1958, as was provided for by the trade agreement on reciprocal deliveries. This was due to a reduction in Soviet imports of wool, furs, hides and butter.

While Soviet exports to Mongolia of consumer goods decreased, there was an increase in the export of machinery and equipment. The Soviet Union is helping that country in constructing more than 30 industrial and agricultural projects.

The decrease in Soviet-Korean trade turnover last yea was mainly brought about by a decline in Soviet imports. At the same time the Soviet Union increased its deliverie to the Korean People's Democratic Republic of certain commodities including transport equipment (electric loco motives and trucks). The agreement both countries signe in March 1959 on Soviet technical aid to Korea in the con struction and expansion of a number of industrial enterprises provides favorable conditions for an extension of trade in the coming years.

Soviet-Albanian trade in 1958 increased by almost 25 per cent. The USSR sold Albania large quantities of machines and equipment for the oil industry, as well as shi Imports from Albania remained on the 1957 level.

There was a 38-odd per cent increase in the trade tur over between the Soviet Union and the Democratic Repub

Vietnam. The progress that country made in the develop-
ent of her national economy in 1958 enabled her to step
her exports to the Soviet Union of oil seed, coffee, tea,
ice, fruits and other commodities. The Soviet Union sold
the Democratic Republic of Vietnam machinery and
quipment, pipe, fertilizer, yarn, textiles and other goods.

As a result of negotiations on economic cooperation and
ade with a number of the people's democracies, the
viet Union concluded with them long-term agreements
reciprocal deliveries of staple commodities until 1965.
hese agreements are bound to strengthen the world so-
alist economic system.

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RADE WITH CAPITALIST COUNTRIES

Soviet trade with the capitalist countries was marked
a further increase of 3.7 per cent in current prices,
hile the physical volume of trade turnover increased by
out 16 per cent.

In the past few years the Soviet Union has been conclud-
g a greater number of long-term agreements with cap-
alist countries. In addition to the long-term agreements
hich had been formerly signed with Finland, Austria,
aly and Japan, similar agreements were signed last year
ith the Federal Republic of Germany, France, Sweden,
orway, Greece and India. Moreover, long-term agree-
ents were concluded with the United Arab Republic (UAR)
Soviet economic and technical aid in the construction of
e first section of the Aswan Dam, and with Argentina on
livery of oil-industry equipment and the granting of a
0-million-ruble credit. In 1958 for the first time trade
reements were signed with Iraq, and at the beginning of
is year with the Republic of Guinea and with the Sudan.

Soviet trade with capitalist countries in 1958 underwent
nsiderable change, especially in regard to the commodity
mposition of Soviet exports and imports.

A characteristic feature of Soviet exports to the capi-
list countries was the substantial increase in sales of
achinery and equipment, whose share in the total exports
the capitalist countries increased from 4.2 per cent
1956 to 14.6 per cent in 1958. An important proportion
these exports consisted, as in the past, of deliveries of
uipment for complete factories to economically under-
veloped countries. It should be noted that last year the
lume of Soviet exports of machinery to the capitalist
untries almost equaled the volume of imports from
em. In 1958 the USSR imported from the capitalist coun-
ies a larger volume of crude rubber, nonferrous metals
d raw materials for the textile industry than in 1957,
multaneously cutting down purchases of certain types of
dustrial products, such as ships and marine equipment,
d machines for the food and light industries. On the
her hand, imports of chemical and building equipment
om those countries were on the increase.

Last year there was a further expansion of trade be-
een the Soviet Union and the economically underdeveloped
untries, particularly with the UAR, India and Indonesia.

It should be noted that in 1958 the economic situation in
e Asian, African and Latin American countries was less
vorable than in 1957. Most of those countries introduced
ore stringent import and foreign exchange restrictions:
e Egyptian Region of the UAR, India, Burma, Indonesia
d certain Latin American countries adopted stricter
ensing; the Syrian and Egyptian regions of the UAR
d Mexico raised their tariffs. Import restrictions affect-
not only consumer goods but also the equipment needed
for carrying out the industrialization programs in those countries.

In spite of these adverse factors the underdeveloped countries have substantially increased their imports of machinery and equipment, raw materials and food products from the Soviet Union; moreover, Soviet foreign trade agencies have established more direct contact with firms in those countries.

In 1958 the UAR occupied second place, next to Finland, in the Soviet Union's trade with capitalist countries.

The principal items of Soviet export to the UAR were oil and oil products, wheat, sawn timber, plywood, pulp, different types of machinery and equipment, rolled iron and steel, tin and aluminum. As in the past, the USSR imported cotton and rice from that country.

Trade with India increased by 50 per cent, reaching a total value of 724 million rubles in 1958. Deliveries of complete sets of equipment and of rolled iron and steel accounted for the major part of this increase. The Soviet Union is supplying India with equipment for the Bhilai Iron and Steel Works, being built with the assistance of Soviet experts. The first section of that plant is already in operation.

Soviet Trade Turnover with Capitalist Countries

(million rubles)

	1958	1957	1958 (in per cent of 1957)
Total	9,076	8,757	103.7
including:			
Austria	342	344	99.4
Britain (excluding overseas possessions)	874	1,153	75.8
Belgium (excluding overseas possessions)	157	235	66.8
Netherlands (excluding overseas possessions)	299	263	113.7
Greece	124	87	142.5
Denmark	113	98	115.3
Federal Republic of Germany	551	534	103.2
Iceland	93	101	92.1
Italy	295	298	99.0
Norway	133	156	85.2
Finland	1,017	1,263	80.5
France (excluding overseas possessions)	671	458	146.5
Switzerland	26	54	48.1
Sweden	233	226	103.1
USA	123	104	118.3
Argentina	133	102	130.4
Uruguay	121	73	165.7
Afghanistan	143	155	92.2
Burma	10	62	16.1
India	724	506	143.1
Indonesia	155	101	153.5
Iran	216	201	107.5
Malayan Federation	472	198	238.4
Turkey	84	58	144.8
Japan	151	68	222.0
UAR (Syrian Region)	154	39	394.9
(Egyptian Region)	779	772	100.9

The Soviet Union purchased from India its traditional export goods, such as tea, shellac, cashew nuts, raw hides and certain industrial products—jute sacks and fabric, woolen fabric and leather footwear.

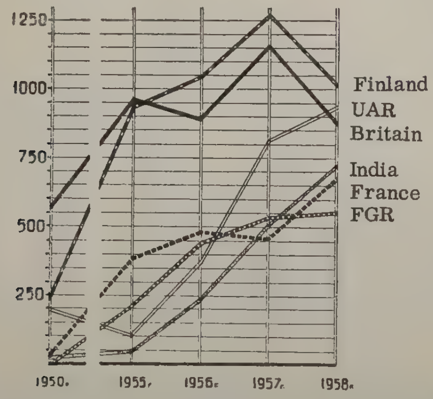
In November of 1958 India and the USSR signed a trade agreement which provides for the reciprocal application of the most-favored-nation clause and for a clearing system which eliminates the conversion of Indian rupees for purchases made by India. Guided by principles of equality and mutual advantage, the governments of both countries will seek to expand the volume of trade to the highest possible level.

Soviet-Indonesian trade in 1958 increased by 50 per cent over the 1957 total in the amount of 155 million rubles. This growth was largely due to increased Soviet exports, particularly of ships and rice. Imports of goods purchased in Indonesia proper went up, amounting to 46 million rubles. Purchases of Indonesian rubber through Dutch firms were discontinued.

Soviet-Afghan trade turnover decreased last year, owing to smaller exports of Afghan cotton and wool. Soviet exports to Afghanistan were on the increase, mainly on account of deliveries on credit of equipment for complete factories. The USSR's share in Afghan foreign trade in 1958 amounted to 30 per cent.

In Latin America regular trade was carried on with Argentina and Uruguay; the turnover with both countries was considerably expanded.

Development of Soviet Trade With Selected Capitalist Countries (in mill. rubles)



In 1958 Finland, Britain, France and the Federal Republic of Germany were the Soviet Union's principal trading partners among the industrial capitalist countries of Europe. Finland headed the list, while the USSR was the second largest purchaser of Finnish commodities, after Britain.

A drop in Soviet-Finnish trade in 1958 was due to a general deterioration of Finland's economic position, which took the form of a considerable decline in the output of several branches of industry, the shrinkage of the physical volume of foreign trade, and a worsening of its financial position. Finland's annual industrial production index was 11 points below the 1957 level.

Devaluation of the Finnish mark and more liberal rules in regard to imports from the Western countries were conducive to a certain extent to a decline in Soviet-Finnish trade. Ships, machinery, timber and paper products continued to be the main items of Soviet import from Finland.

The USSR exported to that country machinery and equipment, oil products, iron and steel, grain, coal, sugar, cotton, fertilizer, etc. Since Finland put a large oil refinery into operation, its purchases of oil products fron the USSR were cut down. In 1958 Finland increased its imports from the Soviet Union of coal, lead, aluminum and certain other commodities.

Following the signing of a protocol (March 13, 1959) on Soviet-Finnish trade for 1959, the trade turnover between both countries is expected to increase this year by some 15 per cent over last year's total. Besides the reciprocal deliveries of traditional export items, Leningrad and Finland will be trading on the basis of special agreements and there will be an exchange of consumer goods.

Among the capitalist countries trading with the Soviet Union, Britain holds one of the foremost positions. Soviet trade turnover with it went down from 1,153 billion rubles in 1957 to 874 million in 1958. This decline was due large to a substantial drop in the prices of certain commodities and a general economic decline in a number of Western countries. In spite of the difficulties which trade with Britain encountered last year, the Soviet Union continued to account for an important share of that country's import of certain commodities. For example, last year 70 per ce of British imports of pig iron came from the USSR, and so did 21 per cent of sawn timber, 21 per cent of plywood, and 23 per cent of mine props. The USSR occupied first place in British imports of tin, manganese ore and furs; and second place, behind Canada, in zinc imports.

As in the past, the USSR purchased from Britain nonferrous metals, rolled iron and steel, and machinery and equipment. In 1958 the Soviet Union placed with British firms a large order (160 million rubles) for the complete equipment of a tire factory, and another one (some 45 million rubles) for the equipment of an acetate rayon factory.

The five-year trade agreement signed in May of 1959 w an important development in Anglo-Soviet economic relations, one of its principal purposes being to achieve a substantial increase in the turnover of the traditional goods of both countries, as well as of other commodities. The agreement specifies, among other things, an increase in reciprocal deliveries of consumer goods.

The long-term agreement on reciprocal deliveries sign by the USSR and France in 1957 resulted in a larger volur of trade. The 1958 turnover was 46 per cent higher than i the preceding year, amounting to 671 million rubles.

There was a decided shift in the commodity compositio of Soviet-French trade, marked by an increase of Soviet exports of machinery and equipment. Last year for the first time the Soviet Union sold France a consignment of turbo-drills.

The Soviet Union is importing from France a wider range of commodities, mainly machinery and equipment, and is also purchasing cocoa beans, coffee, cork, spices, fruits, and certain other goods.

The Soviet Union's share in French foreign trade is still rather small, although it plays an important part in certain items. In 1958, for instance, 50 per cent of the total amount of asbestos France imported came from the USSR, 30 per cent of the anthracite coal, 35 per cent of the manganese ore, and 40 per cent of the coal pitch it imported also came from the USSR. The Soviet Union, for its part, purchased 10 per cent of the rolled iron and steel, and about 30 per cent of the artificial fiber exporte by France.

In view of the successful implementation of the first long-term agreement, at the suggestion of the French another agreement was signed for a three-year period (1960-1962), which provides for a substantial expansion of trade.

Trade with the Federal Republic of Germany is connuing to make some headway. In 1958 the trade turnover nounted to 551 million rubles, but this is still far below e actual possibilities of both countries.

Timber, oil products, nonferrous metals and cotton were, s in the past, the main items of Soviet export to West ermany. Other important items included grain, manganese re, asbestos and apatite concentrates. Expansion of Soviet xports to West Germany was hindered by restrictions imosed by German authorities on certain Soviet commodities.

Soviet imports from West Germany in 1958 increased by 5.5 per cent; imports of machinery were up more than 60 er cent, mainly due to purchases of equipment for the nemical, building and printing industries. Imports of nemicals also increased, but there was a 14 per cent rop in the imports of raw materials.

The volume of Soviet-Italian trade remained approxiately at the 1957 level, totaling 295 million rubles in 958. Italian firms have displayed a keen interest in doing ore business with Soviet trading agencies and have purnased considerably larger quantities of oil, timber and anks for rolled pipe; moreover, for the first time Italy ought from the USSR ferromanganese, pulpwood and ome other commodities.

Owing to a drop in the prices of some food products and w materials (citrus fruit, staple fiber, rayon yarn), oviet imports from Italy declined last year in terms of alue but the physical volume remained the same as in e preceding year.

In keeping with the long-term agreement signed in 1957, e USSR and Italy signed a protocol last December on the 959 trade turnover which provides for reciprocal deliv- ries in the amount of 600 million rubles.

Trade with Austria last year was carried on on the basis the three-year agreement concluded in 1957. In addition industrial goods, the Soviet Union purchased certain ommodities from Austria which did not find a ready maret in the Western countries (footwear, textiles and other onsumer goods), imports of Austrian footwear almost ipling. Soviet exports to that country included coal, iron nd manganese ores, ferroalloys, coke and other raw marials. It is expected that this year's turnover in Soviet- ustrian trade will be 50-odd per cent greater than that last year.

Soviet-Swedish trade is continuing to expand: The value last year's trade totaled 233 million rubles. The inrease was mainly due to larger Soviet purchases; Swedish nports of Soviet goods remained at the 1957 level. In 958 the USSR bought larger quantities of equipment in veden for the chemical and building industries, and more nips. Soviet exports included oil products, coal, coke, anganese and chromium ores, asbestos, fertilizer, pig on, ferroalloys and other goods.

Last year, for the first time and on the Swedish Governent's initiative, the USSR and Sweden signed a three- ear agreement on reciprocal deliveries (1959-1961). It estimated that at the end of that period the two counies' trade turnover will be about double the 1959 volume. he agreement provides for large Soviet orders of equipent for the pulp and paper industry.

There are certain prospects of further expansion of ade with other West European countries too, including orway and Iceland, with whom the Soviet Union has long- rm agreements on reciprocal deliveries.

The volume of Soviet-Japanese trade more than doubled 1958 compared with the 1957 total, yet it is still insigficant. In 1958 the USSR exported more timber, coal d certain other commodities, and for the first time sold that country potash salts, soybean cake, corn and wheat.

Owing to the unfavorable trade and political conditions prevailing, through no fault of the Soviet Union, Soviet trade with the USA continued to be insignificant. Soviet trading agencies sold to the United States benzol, goat hair and furs; they purchased raw hides, chemicals and certain types of machinery.

The successes scored in the national economy in the first six months of 1959, the satisfactory implementation of the long-term and annual trade agreements, and the signing of new agreements with socialist and capitalist countries are some factors which augur well for a further great advance in the Soviet Union's foreign trade.

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A. Smirnov

Soviet Technical Assistance in the Construction of Plants Abroad

The post-war period has been characterized by a considerable expansion of the economic ties between the Soviet Union and foreign powers, and by the appearance and extensive development of new forms of economic collaboration. Among these forms is technical assistance in the construction of industrial enterprises and other structures, now being given by the Soviet Union to a number of countries. The Soviet people have achieved enormous successes in the development of all branches of industry and particularly in the manufacture of machinery. The powerful manufacturing and technological base created in the years of Soviet power makes it possible for the Soviet Union to grant all-round aid to other countries in the development of their economies.

The 21st Congress of the Communist Party of the Soviet Union has outlined a grandiose program for a new and mighty upsurge of the economy, science, culture and material well-being of the Soviet people. As a result of the further increase in the industrial potential of our country, even more favorable conditions will be created for expansion of all forms of economic collaboration between the Soviet Union and foreign countries.

Technical assistance in the construction of industrial enterprises and other structures now being given by the Soviet Union to a number of countries is realized in the form of the carrying out of prospecting and planning, the delivery of complete sets of equipment and the assignment of skilled Soviet personnel to provide aid in the erection of equipment, the launching of operations at various enterprises and mastery of the manufacture of the finished product.

At the beginning of 1959, the Soviet Union had undertaken to give technical aid both to socialist and to economically-underdeveloped countries in the construction of more than 720 large industrial enterprises and about 300 individual departments and installations. Among these there are enterprises, departments and installations in the metals, the metal-mining, the power, the chemical, the petroleum, machinery-manufacturing, light, textile, foodstuffs, woodworking, pharmaceutical and other branches of industry, as well as installations having cultural and service purposes.

The considerable expansion of the scale of collaboration between the Soviet Union and other countries in the field of erection of enterprises in virtually all branches of industry has resulted in an increase in Soviet exports of machinery and equipment. There has been a particularly sharp rise in the export of equipment and materials in the form of complete enterprises, and in the percentage of this type of export in the total export of machinery and equipment. Thus, whereas the total increase in Soviet exports of machinery and equipment from 1950 to 1958 was 270%, the export of equipment and materials in the form of complete enterprises rose 14-fold, and the share of equipment and materials for complete enterprises in the total export of industrial equipment from the Soviet Union has risen from 17% in 1950 to 62-67% in 1956-1958.

With the further expansion of the volume of work performed in the construction of enterprises in various branches of industry abroad, changes have occurred in the structure of the Soviet export of equipment for complete enterprises, but the total volume of the export has risen unswervingly. In this respect, the year just past, 1958, was no exception, despite the fact that there was something of a decrease in the volume of delivery of entire plants to certain socialist countries.

The development of native industry in the socialist countries, such as China and Poland, has made it possible for these countries to satisfy their own needs for certain types of equipment and materials required for the construction of enterprises to an ever-increasing degree, and this played a role in the reduction of the deliveries of certain types of equipment for complete enterprises from the Soviet Union in 1958. (See Graph 1 and Table 1).

In recent years, as we know, the Soviet Union has signed, with China, Albania, Bulgaria, Rumania and other socialist countries, and also with certain economically-underdeveloped countries, a number of important new economic agreements in accordance with which it will extend technical assistance to these lands in the construction of a considerable number of large industrial enterprises. This will result in a further increase in the volume of Soviet deliveries of complete sets of equipment during this very year. The export of large and medium-sized steam boilers this year will be 150% greater, that of metal-working machine tools will be almost 100% greater, that of steam turbines will be 300% greater, etc., than in 1953.

The basis of the relationships that have come into being among the countries in the socialist camp is provided by the noble principles of proletarian internationalism. The peoples of the socialist countries, tied together by knots of brotherly friendship, and by the common objective of the upbuilding of socialism and communism, are continually extending selfless mutual aid and support to each other. Extensive economic collaboration, an inseparable portion of which is brotherly mutual aid, is developing between the Soviet Union and the socialist countries.

The first agreements on extension of economic and technical aid to socialist countries in the construction of plants was concluded between the Soviet Union and the People's Republic of Albania (July 25, 1947), with the People's Republic of Bulgaria (August 23, 1947 and August 9, 1948), with the Polish People's Republic (January 26, 1948, and June 29, 1950), with the Rumanian People's Republic (January 24, 1949), and with the Chinese People's Republic (February 14, 1950). Similar agreements have been concluded with Czechoslovakia, Hungary, the German Democratic Republic, the Korean People's Democratic Republic, the Democratic Republic of Vietnam, and with Mongolia. The share of the socialist countries in the total volume of commitments by the Soviet Union for technical aid to oth states in the construction of enterprises under agreemen concluded from 1947 to 1959 is about 80%, of which China accounts for 37%, Poland for 10%, and Bulgaria for about 8%.

In accordance with these agreements, the Soviet Union committed itself to aid the socialist countries in the construction of about 620 industrial enterprises and 190 separate departments and installations, including Poland (See Table 2.)

The Soviet Union has assisted or is currently engaged in assisting the socialist countries with technical aid in the construction of:

66 integrated mills, plants and shops in the ferrous an non-ferrous metals industries (the ferrous metals enterprises will yield a total of about 39 million tons of steel per year);

52 enterprises in the ore- and coal-mining fields (the coal mines will produce 55 million tons of coal per year);

41 enterprises in the chemicals industry (these enterprises will produce, among other things, not less than a million tons of nitrogen fertilizer — recalculated as ammonia — and about 150,000 tons of synthetic rubber);

15 petroleum and shale refineries and units (the petroleum refineries and units will be able to process about 15 million tons of petroleum per year);

more than 100 enterprises of the machinery-manufacturing industry: machine-tool manufacturing, automotive tractor, agricultural equipment, ball-bearing, power and electrical equipment, drilling and cutting tools, miscellaneous apparatus and instruments, and a long list of oth products (the plants in the automotive and tractor and ag cultural equipment industries will have a yearly manufacturing capacity of about 55,000 automotive vehicles and 67,000 tractors and agricultural machines);

87 thermal and hydroelectric plants of a total installe capacity of more than 15 million kilowatts.

In addition to the enterprises in these branches of indu try, the Soviet Union is granting the socialist countries technical assistance in the building of enterprises in the construction-materials industry, the light, textile, foodstuffs, paper-and-pulp and wood-working industry, as we as of enterprises to manufacture antibiotics and other medicaments, and in the construction of radio stations a television broadcasting centers.

During the first post-war years, when the socialist countries were engaged in rebuilding their war-ravaged economies, they imported primarily particular models machines and equipment from the USSR. After restorati of the economies had been completed and the socialist countries proceeded to carry out their plans for the deve ment of the national economy, they began to increase the purchases of Soviet equipment for complete plants.

The export of equipment and materials for complete plants to some of the socialist countries in recent years characterized by the data shown in Table 3 (in millions of rubles).

The diminution of export of equipment of complete pla to the Chinese People's Republic, the Korean People's I cratic Republic, Poland and Albania in 1958 as a result the fact that the Soviet Union has completed certain of it commitments in technical assistance with respect to the building of a considerable number of industrial units.

At the same time, due to the development of speciali tion and the expansion of the scale of coordination amon individual branches of industry in the socialist countrie there has been an increase in the export of other types lustrial equipment from the Soviet Union. Chiefly as a sult of increase in deliveries to the socialist countries, export of industrial equipment from the Soviet Union t counting the export of equipment of complete plants) reased by more than 17% in 1958 over 1957.

As a result of the technical aid extended by the Soviet ion, more than 250 enterprises and about 90 individual partments and installations were placed in operation olly or in part as of the beginning of 1959, in socialist untries: 135 enterprises, shops and installations in the inese People's Republic, 46 in Bulgaria, 41 in Rumania, in Poland, 25 in the Democratic Republic of Vietnam, in the Korean People's Democratic Republic, 22 in pania, etc.

The commitments undertaken by the Soviet Union in the anting of technical aid in construction of enterprises in socialist countries were more than 50% fulfilled as of nuary 1, 1959.

The launching of operations at these enterprises made it ssible for the socialist countries to increase their proctive capacities with respect to the output of the most portant types of products. Thus, the total annual pacity in the smelting of steel increased by more than nillion tons, in coal mining by more than 9 million tons, oil refining by more than 1 million tons, in the smelting copper by more than 10,000 tons, in the refining of minum by about 45,000 tons, in the manufacture of nigen fertilizers (calculated as ammonia) by more than),000 tons, and in the power of electric power stations more than 4 million kilowatts. There has been a conlerable increase in the capacities of enterprises manuturing boiler equipment, generators, machine tools, ricultural machinery, bearings, industrial rubber goods, emical products, cement and other building materials, well as the products of the pulp-and-paper, and of the od-working industries. The enterprises of the light, dstuffs, and textile industries that have gone into eration have resulted in an increase in the production various mass consumption enterprises.

During the ten years that have elapsed since the founding the Chinese People's Republic, the Chinese people have formed an enormous work in the socialist industrialiion of the country. During these years, the Chinese ople's Republic has launched operations at hundreds industrial enterprises making for a considerable inease in the output of industry. Assistance by the Soviet ion was of substantial importance in this.

n accordance with the economic agreements concluded ween the governments of the USSR and the Chinese ople's Republic, the Soviet Union extended to China, ing the first five-year plan for the development of economy of the Chinese People's Republic (1953-1957), hnical assistance in the construction of 166 large instrial enterprises. The agreements concluded in 1958-59 envisage the construction and expansion in China, m 1959 to 1967, with the technical assistance of the viet Union, of 125 enterprises in the metal-producing, emical, coal, petroleum, machinery-manufacturing, eleccal equipment, radio engineering, and building materials ustries, as well as in the construction of power plants l enterprises in other branches of industry.

The plants and mills that have been rebuilt and built h the technical assistance of the Soviet Union and the erprises that have already gone into operation have de possible a pronounced increase in the production of iron, steel, rolled metal, coal, the products of the emical industry, and aluminum, and have made it possi for these countries to launch the production of aircraft, automotive vehicles, tractors, and of many agricultural machines. Suffice it to say that the Anshan Integrated Iron and Steel Complex was already producing about 3 million tons of steel in 1957. The country's needs for their respective products are increasingly being met by the high-quality steel mill in Tsitsihar, the automotive plant in Changchung, the chemical plants in Hirin. An uninterrupted flow of electric power to industry and to numerous populated centers of a number of regions in the country is being provided by new power plants: the very large Finman hydroelectric station and the Fushan and Hirin thermal power plants, etc. With the launching of operations at the electric power plants built with the technical assistance of the USSR, the total capacity of power plants in the Chinese People's Republic has increased by more than a million kilowatts. Products are coming off the line at the boiler and turbine plants in Harbin, in the machinery-tool manufacturing, tool manufacturing and cable plants in Shengyang, and in the heavy machine tool plant at Wuhan.

The construction of industrial enterprises is continuing. Giants of heavy industry are being erected at a rapid rate: the Wuhan and Paotow iron and steel complexes, the heavy machinery plant at Fulartse, the tractor factory at Loyang, an oil refinery and many other industrial enterprises.

Considerable industrial construction is going on in People's Poland. In a 15-year period, the Polish people, led by the Polish United Workers' Party, has expended considerable efforts toward the industrialization of Poland, and toward rescuing all the country's districts from a condition of economic backwardness, in creating new enterprises and in increasing the economic power of the state.

"An enormous role in this work," said Comrade W. Gomulka at the friendship meeting in Katowice on July 16, 1959, "was played by the brotherly aid extended to us by the Soviet Union, aid which the Soviet Union is continuing to extend."

During the past decade, the Polish People's Republic has built, with the technical assistance of the Soviet Union, and has launched operations at dozens of industrial enterprises and other units, including the Lenin Iron and Steel Complex at Nowa Huta, the Berut Iron and Steel Mill at Czestochowe, at the Warsaw Iron and Steel Mill, the Legnitz Copper Refinery, the Skawa Aluminum Refinery, the Boleslaw Zinc Mill, the small car plant in Warsaw, the carburetor plant in Lodz, a soda plant, a nitrogen compounds plant, and four power plants with a total capacity of about a million kilowatts.

The largest enterprise built during the six-year plan was the Lenin Integrated Iron and Steel Complex. Today, one single blast furnace at this enterprise (furnace No. 3, which went into operation in August, 1958) yields 1300 tons of pig iron per day, or more than half as much as all the mills of pre-war Poland produced. Upon completion of this mill, it alone will yield more steel than all 23 mills in the pre-war Poland of the noblemen.

With the launching of the new industrial enterprises built with the aid of the USSR, the annual melting of steel in Poland has increased by 1,500,000 tons, the coal-dressing capacity by 1,200,000 tons, the manufacture of nitrogen fertilizers by 75,000 tons, of calcium carbide by 92,000 tons, and of aluminum by 15,000 tons.

The Soviet Union is continuing to grant technical assistance to the Polish People's Republic in the construction of a long list of enterprises in various branches of industry. As a result of the negotiations that took place in

November of 1958, the government of the USSR expressed its agreement to extend technical aid to the Polish People's Republic in seeking new deposits of petroleum and natural gas, in building an oil refinery, in expanding the Lenin Iron and Steel Enterprise, and in development of the copper mining industry.

In Bulgaria, the technical assistance of the Soviet Union has assisted in the founding and substantial expansion of nonferrous and ferrous metallurgy, of the manufacture of agricultural machinery, the power, electrical equipment, light, and foodstuffs industries. Modern manufacture of mineral fertilizers was designed. With the launching of operations at the installations erected with the assistance of the USSR, the total power of electric power plants of Bulgaria has increased by 260,000 kilowatts, the production of pig iron by 100,000 tons, the smelting of steel by 200,000 tons, the output of rolled metal by 100,000 tons, and the production of mineral fertilizers by more than 60,000 tons.

The technical assistance in the construction of industrial enterprises given by the Soviet Union to the socialist countries makes for a more rapid development of their national economies and for a rise in the living standards of their peoples.

In turn, the lands of people's democracy are granting technical assistance to our country. Thus, for example, the German Democratic Republic is delivering complete sets of equipment for cement and sugar mills to the Soviet Union, and equipment for electric power plants of under 50,000 kw. in capacity; Czechoslovakia is delivering equipment for sugar and cement mills, and for power trains; Hungary is delivering complete equipment for 60 canneries, 50 tomato-paste production lines, and 15 lines for the processing of fowl, as well as equipment for an oxygen plant, and refrigerators; Poland is delivering equipment for sugar mills and plants for manufacturing cellular concrete.

Economic collaboration in the construction of industrial enterprises is also progressing among the lands of people's democracy themselves. The industrially more advanced countries are granting technical assistance to the less advanced. In individual cases, the delivery of equipment of entire enterprises and the granting of technical assistance is being done on a credit basis.

The relationships of intimate economic collaboration and brotherly mutual aid among the socialist countries have found brilliant expression in the declaration of the conference of representatives of Communist and Workers' Parties of socialist countries that occurred in November, 1957, where it was stated that an inseparable component of the mutual relationships among socialist countries is brotherly mutual aid, which constitutes a bright manifestation of the principles of proletarian internationalism. This is borne convincing witness to by the ever-increasing and daily growing economic collaboration among the countries in the socialist camp.

In recent years, economic and technical collaboration between the Soviet Union and countries that have liberated themselves from colonial oppression, have won political independence, and have taken the path of independent development, has been undergoing successful expansion. The Soviet Union has concluded agreements with many of these countries to grant them assistance in the construction of a variety of industrial enterprises. At the beginning of 1959, the Soviet Union had granted assistance to underdeveloped countries in the construction of more than 100 industrial enterprises and about 110 other units(3), among them nine iron and steel mills, 13 coal and ore mines, seven enterprises in the chemical industry, 12 thermal and hydroelectric plants, six oil refineries, 11 machinery-manufacturing plants, and a considerable number of enterprises in the building materials, the light, the foodstuffs, and other in tries. The total number of enterprises, individual shops installations erected or to be erected in the various cou tries with the technical assistance of the Soviet Union is dicated by the following data:

	Enterprise	Individual shops installations
Afghanistan	7	19
Burma	—	11
India	20	2
Indonesia	4	3
Iraq	16	9
United Arab Republic	39	54
Ceylon	8	6

In addition to the construction of industrial enterprise the Soviet Union is granting technical assistance to the economically underdeveloped countries in the building of irrigation systems, in the provision of water to pasture lands, in the planning of schemes for multi-purpose utili tion of river water resources (electric power, shipping, irrigation), in geological exploration and topographical w in the building of centers of learning for the training of native personnel for various branches of industry, etc.

In conjunction with the expansion of the scale of constr tion of industrial enterprises in economically underdeve countries, there has been a considerable increase in the port of equipment and materials for complete enterprise from the Soviet Union to these countries (in millions of rubles):

	1955	1956	1957	1958
India	0.3	23.2	173.5	392.9
Afghanistan	4.0	6.9	13.4	38.9
The Egyptian area of the United Arab Republic	—	0.1	1.9	12.6[1]

[1] United Arab Republic as a whole.

In 1958, equipment and materials for complete enterprises represented 90% of the total exports of industrial equipment from the Soviet Union to India and Afghanista

Four enterprises and 11 other units have been built in Afghanistan to Soviet plans. The construction of an airp and a truck road through the Hindu Kush will be complete the near future.

Testimony to the further expansion of Soviet-Afghan e nomic and technical collaboration is provided by the sig ture, on May 28, 1959, of a new agreement which, amon other things, envisages the construction of a highway fr Kushka through Herat to Kandahar. Its length is over 75 kilometers.

In India, the first blast furnace of the iron and steel n at Bhilai went into operation in February, 1959. The er tion of this plant, the capacity of which will be over a million tons of steel per year, is to be completed in 196 It will yield 17% of the total quantity of steel smelted by the government-owned mills in India.

In November, 1957, an agreement was signed between USSR and India, in accordance with which the USSR will India technical aid in erecting a heavy machinery plant Ranchi, the capacity of the first unit of which will be 45 ns of various types of equipment per year, a plant to make ining equipment in Durgapur, with a capacity of up to),000 tons of machinery per year, a thermal power plant of i0,000-kw. capacity in Neyveli, a number of mines with a tal capacity of two and a half million tons of coal per ear, and other industrial enterprises.

In connection with the construction of the Bhilai iron and eel mill and with preparation for the erection of other enrprises, the export of equipment and materials for comete enterprises from the USSR to India was considerably creased.

At the end of May, 1959, a new agreement with India was gned in accordance with which the Soviet Union will assist dia in the construction of government-owned enterprises produce pharmaceuticals, drugs, and surgical instruents. This agreement is testimony to the further expanon of Soviet-Indian economic and technical collaboration.

In March, 1959, an agreement on economic and technical d between the Soviet Union and the Republic of Iraq was gned. In accordance with the terms of the agreement, the oviet Union will provide technical assistance to the Reiblic of Iraq in the construction of enterprises in the mainery-manufacturing, chemical, foodstuffs and light induses and of certain other objects having major economic ilue for the country's economy.

A major event in the life of the Soviet and the Ethiopian eoples was the signing, in July of this year in Moscow, of trade agreement between the USSR and Ethiopia, and the cchange of letters on questions of expansion of economic ollaboration between these countries. In accordance with e contractual agreement, the government of the USSR, esirous of meeting the wishes of the government of thiopia, expressed its readiness to extend assistance in e development of the Ethiopian economy and, with this ojective, to facilitate the assistance of economic and technical aid by Soviet organizations in the construction of industrial and other projects. Fulfillment of jobs of planning and prospecting, the delivery of Soviet equipment and materials for the construction of these projects, and expenditures having to do with the extension of other types of technical assistance will be paid for out of a long-term credit extended by the Soviet Union to Ethiopia on favorable terms to the sum of 400,000,000 rubles.

The Soviet Union is extending aid to other countries on fair commercial terms. This is the fundamental difference between Soviet aid and the "aid" of the imperialist countries Monopoly capital, penetrating into the economically underdeveloped countries under the pretext of extending aid, is actually interfering with the development of native industry in these countries, and strives to inhibit their industrialization. Seeking to maintain the economic backwardness of the countries of Asia, Africa and Latin America, the foreign monopolies hope to continue to use them, as before, as sources of raw materials and markets.

Contrary thereto, the economic collaboration of the Soviet Union and other socialist countries with economically underdeveloped countries guarantees to these lands the development of their national industry and their entire economy in complete correspondence with the desires and strivings of these peoples.

The all-round economic and technical collaboration between the Soviet Union and the countries of the socialist camp, as well as with non-socialist countries desirous of developing their economic ties with the Soviet Union, effectively assists an upsurge in the national economy and an increase in the living standards of the peoples of these countries. This form of collaboration is a significant factor in strengthening the friendship among the peoples and in the preservation of peace throughout the world.

ABLE 1 Export of Certain Types of Equipment of Complete Enterprises from the Soviet Union

	1953	1955	1957	1958	1959 (commitments)
Large and medium steam boilers (tons of steam per hour)	2,780	3,140	4,209	610	7,305
Steam turbines and generators (thousands of kw.)	350	336	576	490	1,400
Metal-cutting machine tools (units)	3,351	3,259	4,539	1,900	6,700
Forging and stamping equipment (units)	489	504	767	297	950
Equipment for the metals industries (thousands of tons)	31	35	47	54	48
Equipment for the chemical industry (millions of rubles)	—	—	64	86	150
Petroleum equipment (thousands of tons)	—	—	4	3	8

GRAPH 1

Export of Industrial Equipment and Equipment for Complete Enterprises from the Soviet Union (millions of rubles)

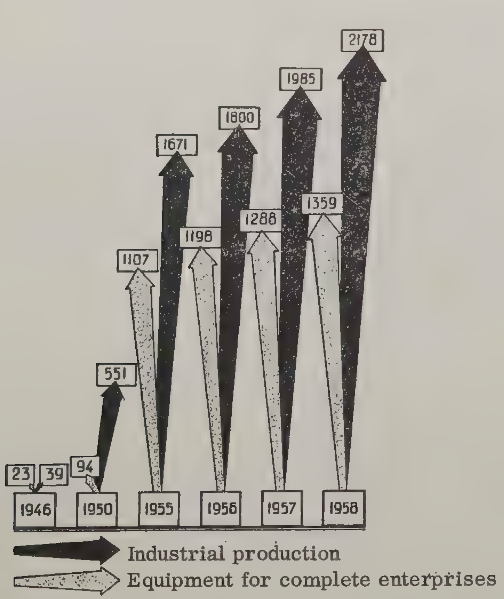


TABLE 3

	1955	1956	1957	1958
Albania	5.5	9.9	9.9	7.2
Bulgaria	55.5	51.1	33.6	67.1
Hungary	18.0	8.5	4.9	5.3
China	566.0	867.8	836.1	644.6
Korean People's Democratic Republic	6.9	17.3	26.5	11.2
Mongolia	10.9	21.2	26.7	23.3
Poland	355.6	150.7	124.2	69.9
Rumania	71.1	29.2	15.0	39.2
Czechoslovakia	13.1	7.7	9.1	17.1

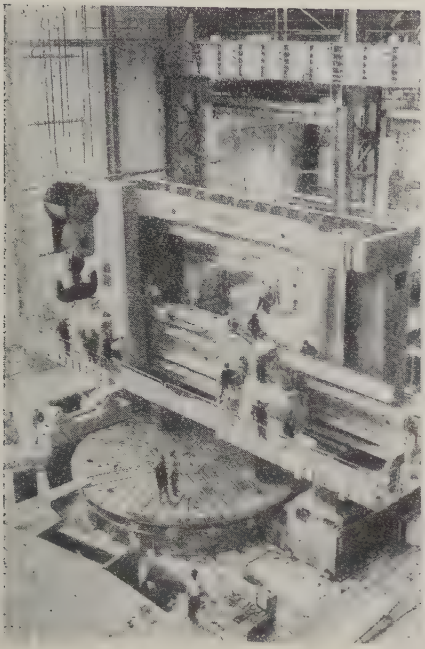
TABLE 2

	Enterprises	Separate shop and Installations
Albania	58	23
Bulgaria	45	25
Hungary	27	4
Democratic Republic of Vietnam[1]	16	15
China	291[2]	59
Korean People's Democratic Republic	30	15
Mongolia	21	10
Poland	68	8
Rumania	60	23
Czechoslovakia	8	8

[1] Including commitments to build enterprises free of char

[2] Including commitments under the agreement of Februar 7, 1959

One of the Departments of the Wuhan Heavy Machinery Manufacturing Industries Built in the Chinese People's Republic with the Technical Assistance of the Soviet Union. The Plant Went into Operation Ahead of Time, in September, 1958. This Plant Is Equipped with First-class Soviet Installations.



A Department in One of the Machinery-Manufacturing Enterprises at Harbin (Chinese People's Republic) in which Soviet Equipment Has Been Installed.

A Portion of the Area of a Nitrogen Fertilizer Plant in Kadzezin (Poland). This Plant Was Built with the Technical Assistance of the Soviet Union.

Cement Mill at Banska-Bystritsa (Slovakia). This Plant Has Both Czechoslovak and Soviet Equipment.

General View of the Construction of the Largest Iron and Steel Complex in Asia, at Bhilai (India). The shops of this plant are being equipped with up-to-date Soviet equipment.

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